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SOVIET UNION ECONOMIC AFFAIRS

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PLANNING OF NEW TECHNOLOGY DISCUSSED AT CONFERENCE

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 4, Apr 87 pp 125-126

[Report by Yu. Bakayev and S. Kapustin on an All-Union conference held at the Academy of National Economy attached to the USSR Council of Ministers on "Improving the Planning of Development and Introduction of New Generations of Equipment"; date not given: "Planning New Generations of Equipment"]

[Text] At the Academy of National Economy attached to the USSR Council of Ministers an All-Union scientific conference was held on the topic "Improving the Planning of Development and Introduction of New Generations of Equipment." Participants were staff members of the USSR Gosplan, the USSR State Committee for Inventions and Discoveries and other ministries and departments, the USSR Academy of Sciences, scientific-production associations and enterprises and staff members of scientific-research institutes and planning and design organizations, VUZ's and institutes for advanced training, instructors and auditors of the Academy of Social Sciences attached to the CPSU Central Committee and the Academy of National Economy attached to the USSR Council of Ministers.

On opening the conference, Ye. K. Smirnitkiy, the rector of the Academy of National Economy attached to the USSR Council of Ministers, pointed out the exceptional urgency of problems of operation and planning of new generations of equipment and their national-economic importance in implementing the policy of the 27th CPSU Congress of accelerating the social and economic development of society.

Academician A.G. Aganbegyan devoted his report to the principles of the present stage of the scientific and technical revolution. Their planned use, ensuring the union of the highest achievements of scientific and technical progress with the advantages of the socialist system of management, is the objective basis of planning new generations of equipment. The creation of an integrated and effective mechanism of planned use of these principles contributes to the goals of acceleration, intensification and conservation of resources and to a radical improvement of quality and competitiveness of products. Special attention was given to questions of forming a modern worker, to new demands on management personnel, organization of production and

creation and functioning of intersectoral scientific and technical complexes called upon to speed up the effective introduction of new generations of equipment and intensive technologies.

Chairman of the USSR State Committee for Inventions and Discoveries I.S. Nayashkov examined the problems of large-scale introduction of the results of scientific discoveries and inventions, the reasons for slowing down of the growth of indicators of inventive, patent-licensing and rationalizing work and the chief defects in management of it and in planning. He acquainted the participants of the conference with progress in the work of drafting the Law on Discoveries, Inventions and Licenses and elucidated questions of informational support and legal regulation of inventions, economic stimulation of inventors, rationalizers and developers as well as labor collectives for inventions introduced for the first time and industrial models and new types of equipment and technology developed on their basis.

Academician T.S. Khachaturov touched upon present problems of working out the basic economic problems of scientific and technical progress, increasing the effectiveness of theoretical and applied scientific investigations of the latest achievements of science and technology. He educed and characterized the highest priority directions of scientific and technical progress and ways of their realization within the framework of comprehensive cooperation of CEMA member countries and dwelt on questions of resource conservation and rational use of nature. The speaker pointed out the need of generalizing advanced experience of creation and use of modern types of equipment and technology and working out practical recommendations for improving planning of development and introduction of new generations of machines.

Prof Yu. V. Yakovets, doctor of economic sciences, devoted his report to the planned use of the objective laws of scientific and technical progress and study of the cyclicity of succession of revolutionary and evolutionaray periods in the development of science and technology. He provided a basis for the practicability of going over to comprehensive planning of new generations of equipment and elucidated questions of its methodology and organization. Such a transition presupposes the creation of a reliable scientific base: expansion of basic research on the laws of scientific and technical progress, the planned use of the latter as well as applied development relating to the content and methods of retrospective analysis and forecasting of succession of generations of equipment and technology in different sectors and methods of developing generalizing all-round indicators of scientific and technical progress and the full national-economic effect of new generations of equipment and the like. Furthermore, experimental work is needed on the introduction of a system of integrated planning of scientific and technical progress, preparation and implementation of the economic experiment of planning and economic stimulation of development, introduction and dissemination of new generations of equipment.

The practice of forming a system of integrated planning of the development of science and technology was examined by V.V. Simakov, department chief of the USSR Gosplan. He analyzed the new approach to compiling a plan of scientific and technical progress, its structure and system of integrated indicators. The number of approved indicators and targets of the 5-year plan was reduced

several fold. At the same time, the attention of ministries was concentrated on concrete targets providing for acceleration of scientific and technical progress. Evaluation of the correspondence of the quality of systems of new generations of technology, equipment and materials to the predicted world standard and a radical rise in labor productivity should serve as criteria in selection of the most effective scientific and technical achievements and determination on their basis of plan targets.

The experience of planning and predicting new generations of equipment under the conditions of restructuring of the economic mechanism and the transition to new methods of management was shared by A. A. Nesterov, general director of the Kompleks Scientific-Production Association.

Questions of creation and introduction of essentially new technologies and restructuring of the resource-conserving policy were illuminated by corresponding member of the USSR Academy of Sciences N.P. Laverov. He singled out power conserving, wasteless and ecologically clean technologies, significantly boosting the social and economic effectiveness of public production. Their introduction requires a significant expansion of the special-goal program of planning and creating an effective economic mechanism of resource conservation and protection of the environment.

Doctor of Economic Sciences A.N. Lyusov analyzed problems of planning training of administrative personnel. The feasibility was stressed of introducing a single form of assessing education, upgrading of qualifications and training in all forms of postgraduate education of economic managers. It is important, the speaker noted, to expand training and upgrading of qualifications of managers of the top level of state administration relating to questions of scientific and technical progress and to create intersectoral and international centers for study, training and upgrading of qualifications of administrative personnel.

In the conference section "Laws of Scientific and Technical Progress and the Strategy of Planning," there were discussed theoretical questions of improving the planning of fundamentally new equipment; questions of raising the efficiency of development and utilization of new generations of equipment; regional and sectoral problems of a single technical policy.

The section "Overall Planning of Development, Utilization and Dissemination of New Generations of Equipment" examined problems of planned management of development of science and technology and planning of the development of fundamentally new equipment, acceleration of retooling of production, improvement in the evaluation of effectiveness of new generations of equipment and development of economic planning methods of introducing progressive technology and equipment.

In the section "Planning the Introduction of Inventions and Discoveries," it was noted that in the state plan for the 12th 5-year period, the section on preparation and introduction of major inventions is given prominence. At the present time, the conception and methodological recommendations for the

forming of a section "Discoveries, Inventions and Patent Licensing Work in the USSR" in the Comprehensive Program of Scientific and Technical Progress for 1991-2010 are being formed.

The section "Planning the Development of Robotic Equipment and Flexible Production Systems" examined the causes holding back the spread of equipment for comprehensive automation of production.

In the section "Planning of Comprehensive Utilization of Raw Materials and Introduction of Wasteless Technologies," it was pointed out that resource conservation is becoming a decisive source in the satisfaction of the needs of the national economy for fuel, power, raw and other materials. The situation, however, remains unsatisfactory. Solution of the problem requires the development of a long-range program of protection of the environment and rational use of natural resources.

The section "Planning the Training and Upgrading of Qualifications of Personnel under the Conditions of Scientific and Technical Progress" validated the usefulness of planning over the long term the training of workers and specialists on the basis of long-range prediction of the needs of the national economy while taking into account qualitative changes in the structure and conditions of public production.

In the recommendations adopted by the conference, it was pointed out that the decisions of the 27th CPSU Congress and measures for accelerating scientific and technical progress create conditions for restructuring of the system of planning the development and introduction of new generations of equipment.

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NOVOSIBIRSK, KRASNOYARSK FIELDWORK, WEATHER CONDITIONS

Waiting for High Water

Moscow IZVESTIYA in Russian 5 Apr 87 p 3

[Article by A. Shcherbakov]

[Text] Krasnoyarsk--The unprecedentedly cold and snowy winter followed by spring threatens to bring equally strong flooding in many regions of the country. On the eve of the inevitable flooding, what preparations are being made for it by the local authorities, industry and agriculture, transportation and medical workers, and the population of the potentially inundated zones? Our correspondents report on this.

There is an unusually large amount of snow in Siberia this year. I recently visited the southernmost rayon of Krasnoyarsk Kray--Karatuzskiy. Sayan hunters and fishermen say that in the unpacked areas the snow drifts are 6-8 meters deep. I must admit that I did not believe this at first. But then when I returned to Krasnoyarsk I received confirmation in the kray administration of the hydrometeorological service.

The grain growers say: a lot of snow--a lot of grain. One can be glad about the rich supply of moisture provided by the snowy winter. But, unfortunately, March was bitterly freezing and the beginning of April was not especially warm, either, and in some places after the 10th of April, according to weathermen, there is supposed to be a sharp rise in the temperature--to 10 degrees Centigrade and more. A rapid melting of the snows will lead to high floodwaters, especially on the Abakan River and the small rivers of the central regions--Kacha, Bugach, Bazaikha, and also the Taymyra and Evenki.

Taking into account the seriousness of the situation that has developed, the ispolkom of the Krasnoyarsk Kray Soviet created a kray flood commission headed by the deputy chairman, V. Glotov. Similar commissions have also been created under the ispolkoms of the Khakass Autonomous Oblast and the Taymyr and Evenki autonomous okrugs as well as in many other regions.

They have begun reinforcing the banks near populated areas and preparing sandbags for building up dams, ice is forming around the bridge supports, technical equipment is being brought up from the lower reaches, and timber and

other cargo are being shipped in. The explosive experts are preparing to fight against the expected blocks of ice in the rivers. Floating equipment and ferry crossings are being repaired. The opening of a multi-apartment building in Minusinsk is being held up until they can create a reliable protection against the possible flooding. In some places people will be evacuated from the danger zones. Civil defense forces have been brought in to fight against the threatening flood. Specialists in this service are standing watch 24 hours a day. Representatives of flood commissions are also on duty in the ispolkoms.

Are the famous Yenisey hydroelectric stations having an effect here? The Sayano-Shushenskiy and its "daughter," the Maynskiy are not causing any special concern. The Sayansk Reservoir is accumulating water and there is already a lot of water on hand. The situation is more difficult with the Krasnoyarskaya GES. Its director, B. Rastoskuyev, announces that today the hydroelectric station is working under a high load, producing 70 million kilowatt-hours a day. The energy engineers are hastening to "empty" the water reservoir for the flooding. Unfortunately, during this winter the level has dropped only 7 meters instead of 15-18 as usual. There was no need for energy. It would be a pity if during the flooding they had to discharge surplus water over the top of the dam. The Ministry of Power and Electrification must find some possibility of processing it into electricity. Letting the water pour over is dangerous for many objects in the lower reaches and also it is simply inefficient.

Navigation Opened Up

Moscow SELSKAYA ZHIZN in Russian 6 May 87 p 1

[Text] Novosibirsk - The first caravan of ships had traveled along the Ob' mark the beginning of the navigation period. During the season the crews of the Western Siberian Steamship Line will have to transport more than 30 million tons of construction materials, equipment and agricultural products. The flow of cargo is increasing along the Vasyugan, Vakh, Chuzink and other small rivers that lead to the oil fields. In order to accelerate shipments, railroad workers are cooperating with the river workers.

Krasnoyarsk Grain Harvest

Moscow SELSKAYA ZHIZN in Russian 13 May 87 p 1

[Article by P. Zinkev]

[Text] Krasnoyarsk Kray--The Siberians cannot get used to the unexpected temperatures.

"But they will not catch the machine operators unawares," the head agronomist of the Sukhobuzimskiy RAPO [rayon agro-industrial association], Yu. Yelizaryev, says confidently. "And this year's work plan takes into account all possible adversities with the weather. The soil had no sooner dried out than 120 sets of machines were taken out into the fields to preserve the moisture. This was done in two trips over a total area of 160,000 hectares.

We did not have to urge anybody on, they worked from dawn till dusk. Practically all of our field work is carried out under contract, and each farm has introduced and strictly observes zonal systems of farming and moisture-saving technology. We hope to harvest no less than 19 quintals of grain per hectare throughout the rayon, and from the area that is being cultivated according to intensive technology (15,300 hectares)--24 quintals per hectare...."

Does this seem to be surprising? The kray has rayons that harvest more grain than they do in Sukhobuzimskiy. But the fact is that the latter work in a zone of risky farming and it was in the relatively recent past that crops of 10-12 quintals here were considered to be records.

Since the past five-year plan the farms have unwaveringly followed the recommendations of scientists concerning structure of planted areas, use of fertilizers, strain renewal, and optimal planting times. They changed over to the contract in a well-thought-out and substantiated way. To certain teams, based on circumstances, they assigned a complete crop rotation, while others had crop cultivation "farmed out." Enthusiasts joined KIT's collectives of intensive labor. They were headed by respected machine operators: On the Pervomayskiy Sovkhoz--Vladimir Morozov, and the Gorskiy--Nikolay Ogryzkov.

In a word, the approach to the work has become thoughtful and economical. And fields that were once fruitless were transformed before their very eyes. In recent years the grain growers have been regularly obtaining 19 quintals of grain per hectare, and on the Sukhobuzimskiy Sovkhoz they harvest 24. Hence the firm conviction of the technologist of the rayon's fields, Yu. Yelizaryev, concerning the destiny of the new crop.

Even though, frankly, the preconditions for good harvests are not especially good. The autumn and summer supply of moisture in the soil is within the range of 55-60 percent of the possible amount. Mineral fertilizers have been received in amounts of 45 kilograms of active substance per hectare--25 kilograms less than last year. It will be necessary to make up for all this through other factors and that which is created through their own efforts. These include increasing (as compared to past times) the doses of organic fertilizer, and providing for good fallow land with soil prepared in the autumn and also high-quality seeds. And, of course, there must be the strictest observance of optimal time periods for conducting all field work. Planting is especially important. Moreover, they are working according to the method of the Nazarovskiy Sovkhoz.

Yes, on the Nazarovskiy the technology for spring field work has been tested by many years of practice and is based on scientific information concerning the local conditions. In the Chulim River area where these farms are located, the spring, as a rule, comes somewhat later than it does to other zones of the kray, and the autumn comes earlier. The time periods are compressed to the limit! They planted early--it is impossible to worry about the weeds because if the planting is late the grain will not ripen. This original method was selected by the leader of Nazarovskiy, Hero of Socialist Labor A. F. Veprev. In spite of the existing traditions, he is taking a special line--on the farm they plant the early ripening strains first, and the medium-ripening strains

later. The difference is a couple of days, and the advantage is clear--the harvest begins at a time with better weather.

"This strategy and tactic has also been prescribed in all regions and zones of the kray," asserts the chairman of the kray agroprom, M. B. Vcherashniy. "There is no other way: the climate here is never very good, and this year nature has already shown her special capriciousness: one is aware of the shortage of moisture in the soil. All forces were used to preserve it--6,500 sets of equipment, which is twice as much as last year."

One must note with satisfaction that the farmers of the kray have created many of the prerequisites for laying the basis for the crop. They cultivated 2.1 million hectares of fallow land for the spring planting (all rayons more than fulfilled the plan), about 600,000 hectares of clean fallow were prepared, and only 133,000 hectares of grain crops will be planted after spring plowing. They were quite concerned about the seeds. In the majority of cases grain of high condition has been planted in the soil. It accounts for more than 90 percent of the overall area instead of 76 percent as was the case last spring. For this year's crops they have applied 12 million tons of manure and compost, which is much more than in previous years.

The majority of Yenisey farms have become convinced of the advantage of effective application of fertilizers, especially when cultivating grain crops according to intensive technologies. In the kray 660,000 hectares with the best predecessors have been allotted to these. Preference was given to such strains of wheat as the Omskaya-9, Skala, Omskaya-12, Irtyshanka-10, and others. They are being cared for by 70 brigades and teams that are working under a collective contract. For intensive technologies this year they have allotted 64,000 tons of effective substance of fertilizers, that is, less than one quintal per hectare. And they cannot even be sure of this scanty dose. Deliveries are planned for the second quarter.

The Yenisey fields have always suffered from a shortage in the soil of phosphorus which accelerates the ripening of plants. Planning agencies must take into account the specific features of the Siberian growing period. Moreover, the kray agroprom also should take more interest in the local resources of phosphorites, particularly the Obladzhanskoye deposit. On a number of farms of Kazachinskiy, Idrinskiy and Pirovskiy rayons they have prolonged the shipment of organic fertilizers and the seeds are not good everywhere.

This spring brought many difficulties with it. But this does not dishearten the farmers. They know that the Siberian fields are responsive to their care!

Springtime on Steppes

Moscow SELSKAYA ZHIZN in Russian 15 May 87 p 1

[Article by P. Chernov]

[Text] Novosibirsk - At the beginning of the second 10 days of May the weather became warm and sunny. This made it possible for the farmers of the

oblast to engage actively in field work. Harrowing has already been done on considerable areas of the kolkhozes and sovkhoses of the Kulunda zone and the Baraba Steppe. The work has also become widespread on the fields and farms of the Central Eastern Zone. Early spring crops are being planted on soil that has been cleared of weeds.

Spring Work in Novosibirsk Area

Moscow SELSKAYA ZHIZN in Russian 22 May 87 p 1

[Article by P. Chernov]

[Excerpts] Novosibirsk Oblast--The rates of field work are increasing on the farms of Iskitimskiy Rayon. The spring here this year was remarkable precisely because the raising of grain crops on all the area was turned over to contract cost accounting [khozraschet] brigades, of which there are more than 100. This is the second year the Iskitimskiy workers have been operating according to this principle and the economic advantages can already be felt. Thus during last season the production cost of 1 quintal of grain was reduced by 52 kopecks, and on the whole expenditures on its production throughout the rayon decreased by 809,000 rubles.

Control of the quality of the work has also increased this year. Most frequently in past years the quality of the planting was inspected only from the shoots, that is, when there was nothing that could be done. Now the crop is monitored beginning with autumn plowing.

There are also other good prerequisites for obtaining a large crop. More than 2 million hectares off fall-plowed fallow and almost 400,000 hectares of regular fallow have been prepared for corn and more organic fertilizer has been applied to the soil than ever before. But perhaps concern number one for the Novosibirsk farmers is the planting material. Three-fourths of the fields will be planted in seeds of the first and second classes! Siberian farmers have been convinced of the undoubted advantage of intensive technology. This year it will be applied on 700,000 hectares of wheat, which comprises more than half of the planet area.

Finally, the moisture should improve the spike of grain. Fairly good supplies of it have been accumulated--more than the average over many years. But nonetheless, now, during the planting season, moisture-saving technology is still being applied on the fields. The essence of it amounts to the flow line-cyclical method of organizing the work of the spring conveyor and combining the equipment in such a way that several operations are performed with one passage of the tractor over the fields. The combination of these sets of equipment has been developed especially efficiently on the Bolshevik Kolkhoz in Ordynskiy Rayon, the Kochkovskoye Experimental Production Farm and many other kolkhozes and sovkhoses.

In terms of the planting norms the farms of the rayons of the Central-Eastern and Kulunda zones have reached the calculated figures. The kolkhozes and sovkhoses of Iskitimskiy, Ordynskiy and Cherepanovskiy rayons are conducting planting ahead of schedule. But still there are many troublesome

interruptions. A number of farms have prolonged the repair of tractors, especially the high-powered ones. As in past years, there are not enough machines for preparing and loading mineral fertilizers. There are only 35 AIR-20 loaders for the entire oblast and 480 are needed. Everything that can be adapted is being used to crush the fertilizers. There are not enough herbicides to destroy perennial weeds or for treating the planted areas. The orders for preparations for fighting against diseases of agricultural crops have not been filled.

Incidentally, these difficulties are nothing new--there are no easy springs. But the more concern that is shown for the land, the more generous the fields are. This is the attitude that prevails today and this is why Siberian farmers are working from dawn to dusk.

Top Dressing of Perennial Grasses

Moscow SOVETSKAYA ROSSIYA in Russian 12 May 87 p 1

[Text] Novosibirsk - The top dressing of perennial grasses is under way in all rayons of Novosibirsk Oblast. The machine operators are working at high rates. In keeping with the oblast program for increasing the production of protein crops, areas planted in pulse-grass mixtures, rape and millet are being expanded. Experiments in cultivating Japanese millet have been started. On the Kulunda and Baraba steppes Sudan grass is widely planted. The leading kolkhozes and sovkhoses have properly estimated its advantages: in dry years the productivity of this crop under local conditions is higher by a factor of 1.5-2 than that of other annual grasses. Farms of the southern rayons of the oblast have taken responsibility for producing Sudan grass seeds.

Flooding in Kansk

Moscow GUDOK in Russian 27 May 87 p 1

[Article by V. Kustov]

[Text] Krasnoyarsk--There is flooding in Kansk. Disturbed and alarmed, I tried to find out how my parents were. Fortunately, the part of the city where the railroad passes near where they live was not flooded. But one-third of the territory of the city--66 streets, 2,600 residential buildings, 30 industrial enterprises, 13 kindergartens and many dining rooms--were covered with water.

The long, cold Siberian spring was suddenly replaced by 3 days of warmer weather. There was rain in the Sayan foothills, where the Kan River starts. And literally in one night the river rose to almost its highest mark, which was registered in 1960.

Sad as it may be, the raging elements were assisted by man himself. A new highway bridge was made out of the barrier that stood in the way of the raging waters and directed them through Kansk along the shoreline fields and

villages. It was constructed below the city, which was not according to the plan, with high shoreline embankments and a narrow "neck" between the shores.

We must give the flood staff its due--it acted efficiently. The rescue work was carried out without stopping. The helicopter crew headed by its commander Major N. Pervushin, acted courageously and resolutely: they removed the people who had been struck by the disaster from little pieces of land or even directly from the roofs of their houses, sometimes using a rubber boat that had been lowered onto the water.

The ill-fated embankments along the sides of the bridge were torn down and the level of the water dropped, but it was still high, although it no longer created a direct threat. Kansk began to be cleared of the wreckage of the flood. All transportation and all bulldozers and excavators were put to work. Day and night the people of the city, including the railroad workers, cleared the drainage ditches of the city and pumped water from the lakes that had been formed and the basements of houses, and saved property and equipment from flood damage. The people were given assistance with food and construction materials.

At the same time the city is preparing for another onslaught of water. It is now snowing almost continuously in the Sayans, according to the kray administration of the hydrometeorological service, and water is accumulating for another flood. Perhaps the Kan will again reveal its real character....

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VEGETABLE PRODUCTION, DISTRIBUTION PROBLEMS IN KAZAKHSTAN, MOLDAVIA DISCUSSED

Improvements in Kazakhstan Urged

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 28 Apr 87 p 2

[Article by Kh. Zhanabayev, head of vegetable and gourd production department, Gosagroprom, Kazakh SSR]

[Text] Recent years have seen kolkhozes and sovkhoses in Kazakhstan go to improved vegetable- and gourd-cultivation technologies. They are successfully introducing an industrial method suggested by the Astrakhan Scientific Research Institute of Irrigated Vegetable and Gourd Production. This method was employed on some 20,000 hectares planted with these crops last year.

The Astrakhan method calls for the use of a whole range of implements for cultivating crops — slitters, wide-span subsurface cultivators and rotary implements, among others. This permits maximum mechanization of labor-intensive operations, a greater number of interrow cultivations in some instances, a minimum number in others and local applications of herbicides and fertilizer. The new techniques have produced increases in vegetable crop yields on 17,300 hectares of 25-27 quintals, 40-60 quintals on the best farms, as compared with the conventional methods of cultivation. It reduces manual labor inputs to a minimum and cuts production costs.

The new technique is being employed over extensive areas in Alma-Ata, Karaganda, Kustanai, Tselinograd and Pavlodar oblasts. The Astrakhan method is not always being introduced quickly enough or, accordingly, to best effect. It is therefore going to be necessary to undertake extensive study and analysis of the experience the farms which are successfully employing the improved technique have gained. It was with this objective in view that the republic Gosagroprom recently conducted a seminar for vegetable growers in the southern oblasts on one of the sovkhoses in Dzhambul Oblast. On the other hand, there is something to be learned from a number of farms in central and northern Kazakhstan as well. Last year saw vegetable growers on Zarechnyy Sovkhoz in Tselinograd Oblast, for example, harvest 274 quintals of vegetables from 540 hectares as compared with the plan target figure of 215. At the same time they were able to reduce production costs per quintal by 2.6 rubles in comparison with the target. Vegetable production operations yielded earnings of 526,000 rubles.

The advantages offered by the new technology are obvious. In the meantime, however, farms in Chimkent, Kzyl-Orda and Taldy-Kurgan oblasts have still been slow to adopt the Astrakhan method. Managers and specialists within the oblast agro-prom organizations are going to have to guide more on experience now available with the new techniques. Particularly in view of the fact that plans this year are calling for them to be applied to vegetable- and gourd-crop cultivation on some 30,000 hectares. Farms in all oblasts have been provided with the full range of implements required for application of the industrial method.

Labor-intensive operations have been mechanized to great advantage in the cultivation of such very early vegetable crops as cucumbers, tomatoes and cabbage. The past year has seen a number of farms begin to use the ANK film-laying machine which can perform a number of operations simultaneously: it sets out the plants, positions the supporting arches, spreads the film and then covers the edges with soil. Plans are now calling for this machine to be used to plant early vegetables on some 1200 hectares. The use of this machine will make it possible to begin these operations 10-15 days earlier and to cut the manual labor inputs some 7-8 times.

The tomato, cucumber and cabbage harvesting operations are being increasingly mechanized as well. This involves the use of vegetable harvesters with boom cranes, containers and polyethylene boxes. The harvesting of the vegetables using this platform makes it possible simultaneously to sort the produce, pack it and put it in containers. It is then moved to the edge of the field where it is loaded onto trucks. This harvesting technique has been successfully integrated into the field-to-store vegetable transport system. It is yielding savings of 7 rubles per ton of produce shipped. Plus the fact that it has increased the productivity of the harvesters some 30 percent. Introduction of this method enabled fruit-and-vegetable-growing farms to save more than 190,000 rubles last year. Unfortunately, however, Alma-Ata and Tselinograd oblasts are the only ones so far to organize vegetable harvesting and transport operations on this basis.

We referred earlier to the seminar on the Astrakhan method held in Dzhambul Oblast. This was not because of any particular fund of practical experience available here. On the contrary, vegetable growing has so far been a slow-growth industry in the oblast. Despite the fact that there were 75 sets of the implements required for the Astrakhan tilling program available here last year, the program was implemented on only 840 of the 1300 hectares. This is only a little more than one-tenth of the vegetable crop taken as a whole. But then at the same time, of course, there is the fact that year in, year out we are still seeing large numbers of students, workers and white-collar employees from the city helping out with the weeding here. Over the course of the 11th Five-Year-Plan period the oblast accumulated a back debt to the state of 80,000 tons of vegetables and 25,000 tons of gourd crops. Last year it was 25,000 tons short of the plan target for deliveries to the state. Figures for average vegetable yields here are running 10 quintals per hectare behind the republic average. And the assortment is extremely limited as well.

Vegetable production in the republic has been levelling off. Scientists at the Kazakh Scientific Research Institute of Potato and Vegetable Farming must also share a good deal of the blame for this. Kazakhstan cannot yet point to its own

high-yield vegetable crops. The institute has yet to develop any appropriate technique for cultivating them here, although it has been in existence for over 20 years now. This is why vegetable growers in the republic are going to have to look to other parts of the country for the best experience.

Moldavian Problems

Moscow SELSKAYA ZHIZN in Russian 30 Jun 87 p 3

[Article by SELSKAYA ZHIZN correspondent V. Okunev]

[Text] The vast fields of vegetables now under intensive cultivation are a feast for the eyes. But the approaching harvest season is a cause for concern — it is possible that not all of the crop will reach consumers.

Yevdokia Vagati's brigade on Krasnaya Bessarabia Kolkhoz in Novoanenskiy Rayon works unirrigated land, but even last year, an extremely dry year, it was still able to harvest as much as 243 quintals of vegetables per hectare and exceed plan targets for sales to the state by large amounts.

"Vegetable growing conditions here are a lot better now," the brigade leader points out. "And we are going to meet our obligation of at least 300 quintals of vegetables. Provided, though, that we don't let the 'green fire' spread."

The green fire.... You can hear this alarming term in a great many parts of Moldavia now. For the fact is that heavy rains have made the weeds grow fast. Fields where vegetables are under intensive cultivation are in the best condition — weeds here have not even been given a chance to start since the spring. This technique has now been adopted in a number of rayons. Let's look, for example, at Grigoriopolskiy Rayon, which has some 30,000 hectares under irrigation. Most of this area is planted with tomatoes, eggplant and green peas, most of these crops arranged in rows.

"The soil gets warmer faster this way," A. Busuyek, chief agronomist for Michurin Sovkhoz, explains. "So this allows us to plant our tomatoes a week earlier than they can where they're still growing them the old way. It's also easier to cultivate between the rows, which we're also doing now."

Three links, B. Frantsuzhan's, N. Balutsa's and P. Platyan's, were able to get an application of herbicide on 460 hectares before the tomatoes were planted. The field was watered once at the beginning of the summer. The machine operators are now completing the second interrow till operation and at the same time applying a dressing. This program proved its value last year, when growers got up to 400 quintals of tomatoes per hectare, as much as 600-700 in some places. The rayon information reference system analyzed this successful performance and used computers to establish times and applications for dressing operations.

Unfortunately, however, these cultivation requirements are not always satisfied in the strictest sense of the term. In neighboring Rybnitskiy Rayon, for example, is the large Mayak Kolkhoz with its extensive vegetable-growing operations.

We arrived there when a brigade of workers headed by A. Tula was thinning the onions. This was no easy task for these women — half-meter-high weeds had entirely covered the sparse stalks. We were interested to find out what kind of yields they got here. Something in the neighborhood of 50 quintals to the hectare as it turns out.... The onions the other brigades work don't look any better either.

"We just can't get everything done," the brigade leader explains serenely.

Brigade leaders on a number of farms in Kantemirskiy Rayon, too, shifted the blame for deficient performance onto other, outside, factors. Weeds are choking many fields here as well. And this despite the fact that the vegetable cultivating brigades, as a rule, are working on a contract basis to boot.

Different brigade leaders, of course, take different views of their own roles. On the whole, most of the vegetable growers in Moldavia are highly experienced, imaginative people. They would not otherwise be capable of producing over 1 million tons of vegetables each year — tomatoes, pepper, eggplant, cucumbers, pumpkin, squash, green peas, fennel, beets, celery and other crops. A great many of them have for all practical purposes mastered the secrets of each individual crop.

The plan for vegetable sales in Slobodzeyskiy Rayon is almost one-quarter of a million tons. Most of this production goes to the country's industrial processing centers, that is, into the national production fund. This explains why the farmers are working so conscientiously these days. Unfortunately, however, the work here requires a great deal of manual labor. Some 2500 hectares have been planted in vegetables using the Astrakhan technique, but the farmers here have only one KRN-4.2 cultivator for interrow tilling. It is poorly suited to this method, however. There are no rotary tillers, no rotary machines to use to cut the roots of the weeds or a variety of other implements.

"We make a lot of our own implements out in the shops, on our hands and knees, as they say," the machine operators complain.

But all this is talk that has consequences only for the future. All efforts here are now focused on the task of cleaning all the weeds out of the field. Family links are now engaged in this tedious work, groups which have now contracted for some 5800 hectares of onions.

"It is precisely this kind of manpower organization which has enabled us to solve the onion problem," we hear in the Moldavian SSR gosagroprom.

But is this the real solution? From this very same Slobodzeyskiy Rayon comes the news that managers on a number of farms have individually, on their own, expressed the desire to rethink the cost figures on onions. People are working without any knowledge of what is going on around them. The reason is not by any means new — the family links are earning too much! Now this is a strange way to put the problem, once you consider the fact that with the old methods of manpower organization a hectare of onions on these very same farms would bring in 50-60 rubles and yields that were not all that high. And now, at a time when each hectare has started to earn several thousand rubles, we are beginning to see the old prejudices rear their heads....

If you permit this reconsideration of the costs here, even if on just one farm, and these figures are roughly the same throughout the republic, you are going to be compromising the very idea of the family contract.

And here is something else that has the vegetable growers worried. The first harvest is now underway of green peas, the green bunch onions and the early cabbage. Tomatoes and cucumbers are coming on. There is still an enormous amount of field work left to do, but the managers and crop specialists are already focusing on the sales. Are the processing facilities going to be prepared? Are they going to start turning away the trucks bringing the produce in from the fields? The unfortunate fact is that all too frequently these fears prove to be well-founded. On one particular kolkhoz in Rybnitskiy Rayon we saw 40 cases of green onions which were already losing the quality and spoiling. This was produce returned by the self-financing Rynitskoye industrial purchasing association. The reason? The kolkhoz had delivered 300 kilograms more onions than it was supposed to! So, referring to the terms of the agreement, the manager of the association's business department, V. Makushinskaya, ordered them to be returned the tens of kilometers back to the kolkhoz!

Now maybe the stores in this city of Moldavian metallurgists are full of vegetables. By no stretch of the imagination! Together with officials of the Rybnitskiy rayon committee of the Moldavian CP we visited three vegetable stores, and in only one of them did we find any cabbage, in this instance delivered from Azerbaijan. Of the stores we visited during our inspection, none had any green onions. So once again, just as we have seen before, the bureaucratic interests take priority while the stores go without vegetables.

...The vegetable growers put forth a enormous efforts to set their plants out and get them growing during the cold winter. And now they spend their days from morning until night working the fields, tending their crops. It's now high time for the organizations within the trade sector to start demonstrating some interest in insuring that these products reach the consumers.

8963
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TIMBER REGION FIRE-FIGHTING TECHNIQUE SCORED

Moscow PRAVDA in Russian 18 Jun 87 p 2

[Article by A. Zhdanov: "Facing a Forest Fire"]

[Text] Chitinskaya Oblast, Buryat ASSR--The forests in the Transbaykal region have been burning for three months and those in the Far East for a little less. Hundreds of thousands of hectares of taiga and forest steppe lands have suffered from the raging fires. In some rayons agricultural, vacation and other settlements have been destroyed and communication and transportation lines damaged. Only through the selfless efforts of fire fighters, Soviet Army soldiers and the local population were the fires prevented from escaping forest areas and invading villages and cities. Collectives from enterprises and organizations, large amounts of equipment and fire fighters from other regions in the country were brought in to put out the conflagrations. However, the situation remains strained. As fires are put out, every day new ones are spotted.

A novice can be distinguished from an experienced fire fighter a long way off. As a rule, the former approaches the fire line backwards, hiding his face from the heat and smoke. I had the occasion to see how, if the fire was spreading along the ground, such people even crouched down, attempting to fight the flames on their hands and knees. People who have saved forests before will not allow themselves to do this. This is because they know that the main thing in a taiga fire is not to lose one's orientation, to vigilantly keep track of themselves and their comrades and to see where the flames are moving in the next second. Even though the smoke stings their eyes and singes their eyelashes and eyebrows, they will not turn away. This way they have a better chance of avoiding serious burns, injuries and death.

Most of those who are standing up against the fires in the Transbaykal and Far Eastern forests know this rule and attempt to follow it. However, this is by no means due to instructions given prior to going out to fight fires (they are not always thorough, often there are none at all). The teacher of the Siberians, Transbaykalers and Far Easterners is more demanding, it is life itself, the fires roar here from April to November.

Practically every year here fires acquire the scale of a natural calamity. Only their location changes. In the 1970's they were mostly in the Chita area.

In the beginning of the 1980's they were blazing especially strong in Khabarovsk and Maritime krays and Amur Oblast. Last year the forests in Irkutsk Oblast and Krasnoyarsk Kray suffered the most. Now the concern is mainly about Amur and Chita oblasts, where, by the middle of June more than 800 fires had been registered, including half-extinguished, contained, active ones, and crown fires, the most dangerous, spreading 10's of kilometers per hour. The forests in Buryatia were burning ferociously right up until the second half of May, when it cooled down sharply and precipitation fell.

So, forest fires, a terrible misfortune, have long been a characteristic, one could say an integral, part of life in the eastern part of the country. There is no denying that they are a bitter part of life, but why are they so tenacious?

For fairness' sake it should be said that objective factors promote this. They can be judged from this comparison alone. While during the unfortunately famous fires in the Moscow area, air humidity was 35-40 percent and was deemed a unique and catastrophic danger, in Chita Oblast, for example, such dry air is no rarity. In some dry days in April humidity falls to 10-16 percent. Then there are the prolonged dry winds. These are ideal conditions for fire.

However, these did not occur yesterday nor a year ago. This is not the first time potential threats have been transformed into a real calamity. It is therefore unthinkable to place the blame only on local natural climatic conditions. It is much more important to understand how effectively we oppose the fire under these conditions.

On 29 April there were no limits to the exasperation of A. Netronin, chief of the Transbaykal Aviation Base for Forest Protection.

"No, you can only come to like it," he said indignantly, after opening a letter from the Oktyabrskiy Rayispolkom in Ulan-Ude. "Again, as it happens during the fire season every year, we are ordered to send people to help the countryside during spring field work. To where! To Yeravninskiy Rayon, where the most intensive forest fire is now burning. There we ourselves need help and are bring in specialists from outside the republic."

Something similar could be seen two weeks later in Chita. The difference here is that D. Akhmetov, the chairman of the Oblast Special Commission on Fire Fighting and deputy chairman of the obispolkom had phoned around to several rayons and oblast organizations insisting upon the replacement, or at least the postponement of measures (instruction for leading cadre, military call-ups, etc), objectively weakening the collective and management apparatus in localities facing the need to intensify the fight against fires.

This detail also deserved attention: even though they had been raging in the oblast for a good six weeks literally not a word was said about fires and progress in putting them out at the 16 May Plenum of the Chita Party Obkom.

V. Petrov, smokejumper at the Ulan-Ude Division of the Transbaykal Air Base for Forest Protection, said: "In the 15 years since I first jumped into a burning forest, little has changed in our equipment and methods of fighting

forest fires. There are still shortages of the most primitive equipment such as shovels and axes, to say nothing of their quality..."

All forestry and fire unit workers with whom we talked reacted sharply to questions about equipment. This is understandable. After all, experience in putting out fires repeatedly shows the frightening consequences of equipment shortages or faulty equipment. At the Chita Forestry Administration they told us how several years ago in Uletovskiy Rayon a forestry worker died simply because he had a nylon jacket which, when it caught fire literally was absorbed into the victim's body. Has equipment improved since then?

"Nothing of the sort," sighed B. Biletskiy, department chief at the Forest Protection Administration, "it's still the same." Even the 16 ruble anti-encephalitis suits were, for some reason, not allotted to us, we got them by accident. We have no waterproof goggles or masks, not enough backpack fire extinguishers and pumps are nowhere to be had..."

Improvements in material-technical supplies for preventing and putting out forest fires are being made at a turtle's pace. A typical example of this is the creation of a domestically made amphibious plan for firefighting. This has drag out for 15 years.

E. Davydenko, deputy head of the Central Aviation Base for Forest Protection, explains, "At one time we had AN-2P seaplanes. However, by the mid 1960's they no longer met increasing flight safety requirements and their operation was forbidden. The question arose as to how to replace them. In 1972 I visited Canada, where I observed the CL-215 flying tanker, capable of carrying 5,500 tons of water on board. I returned to Moscow and described this machine to the head of the USSR State Forestry Committee at that time. As far as I know, the Committee went to the USSR Council of Ministers with a request to purchase the Canadian aircraft. However, since that time there has only been talk about creating the first experimental model. The CL-215, still the only aircraft of such type and class in the world, has been acquired by practically every country having extensive forests.

Let us look at the economic side of the problem. Taking into account land, timber, and environmental protection functions, the value of a hectare of forest in the East Siberian Economic Region is estimated at 951 rubles. According to the general plan for forest protection in Chita Oblast, worked out by the Soyuzgiproleskhoz, it is planned to spend 30.5 kopecks per hectare for forest protection here, that is 0.003 percent of total value per hectare. (For comparison: according to data from VNIPO [All-Union Scientific Research Institute for Fire Protection] MVD SSSR, fire protection outlays in foreign countries range from 3 to 12 percent of total forest value.)

"We do not even have this small percentage," says G. Sekachev, chief of the Chita Forestry Administration, "Our per hectare outlays for all forestry work are about 20 kopecks. Although there is an acute shortage of transportation there are 30,000 hectares for each forestry worker. When I cited these figures to colleagues from Estonia they were very surprised and said that about 20 rubles per hectare were spent on forests there and that each forestry worker was responsible for 1-3 hectares.

"It is incorrect to compare expenditures for maintaining forests in the Baltic and in the Transbaykal area," stated O. Rozhkov, deputy minister of forestry in the RSFSR, when we informed him of Sekachev's calculations. "The forests in Estonia are an order of magnitude more productive than in the Transbaykal and the state gets far greater returns from them."

Well, possibly the comparison is incorrect. But is it correct to expect increased returns from our eastern forests, including increased effectiveness in protecting them, if we give such clear preference to forests in the western part of our country?

Recall the rule of those who fight fires in the Transbaykal and Far Eastern forests: approach the fire and don't turn away! This is very difficult to do. But if it is not done there will be trouble

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NEW TYPES OF CEMENT, CEMENT PROCESSING TECHNOLOGY DISCUSSED

Leningrad TSEMENT in Russian No 4, April 87 pp 22-23

[Article by A. S. Boldyrev, engineer and USSR Council of Ministers prize laureate, "New Building Materials and Urgent Tasks for the Next Few Years"]

[Text] Building materials will play an important role in the technological revolution and in raising the efficiency of the USSR national economy since their production is based on practically inexhaustible sources of the cheapest and most widespread raw materials on earth.

Many kinds of new and modernized building materials will be used widely outside the construction field, particularly as replacements for metals.

We must keep in mind that the average worldwide iron content of ore has dropped from 51 percent in 1950 to 33 percent in 1980. With the lower degree of iron extraction from low grade ore, it will become more difficult to obtain the metal in many regions. Furthermore, depending on their purpose, all forms of steel for crucial construction and parts machining are alloyed with molybdenum, nickel, tungsten, vanadium, cobalt, and so on, but reserves of these elements, which constitute from .001 to .003 percent of the earth's crust, practically are being exhausted.

Just what is needed to replace metals? First of all, concrete made from special cement which could be called "construction-grade". This cement must be high tensile, rapid-setting and made by adding thinly ground silicon dioxide (for complete absorption of calcium hydroxide). Concrete made from such a cementing material will be reinforced with fiberglass and the pore space filled with monomers or modified polymers. In the majority of cases, the aggregate for this concrete will be sand with a fineness modulus of 2.0-3.3 or fine-grained diabase with a strength of 180-200 MP [Megapascals].

The strength of construction grade concrete is 100-110 MP in the first stage and, in the second, after increasing the strength with fiberglass, 120-140 MP. It will be watertight, airtight and corrosion resistant -- that is, it will last practically for ever.

The firm NITTO-BOTEKI & Co. has demonstrated the capability to obtain ultra-strength fiberglass and has set up production of fiberglass with a tensile

strength of 475 kgf per square millimeter, which exceeds the strength of the best types of ultra-strength steel by a factor of 1.5.

I note that in the process of hardening cement stone, all modern methods of microstructure control and, particularly, directed crystallization control must be used.

This concrete can be used as a substitute for metal first of all in dead load structures and can be employed in the manufacture of large diameter high-pressure pipe, stressed structures, solid concrete which is subjected to the actions of an aggressive environment and so forth.

By the year 2000, our sector of industry will have to resolve the problem of reliable wall materials which allow minimal heat loss. According to data from GOSSTROY we must cut heat loss a minimum of 30 percent against modern ceramic-concrete panels. This must be done with three-ply, suspended panels with thermal insulation plates and factory finished, asbestos-cement slab sheeting with high bending and impact strength.

Since we mentioned asbestos cement, then we should turn our attention to chrysotile asbestos processing technology. It is possible to get carried away by the automated, highly ecological method of obtaining asbestos fibers already developed long ago.

But are there production and technological treatments for raw materials in the world by which the initial strength of the material would not decrease many times over?

In our own asbestos treatment process using multiple crushing, the tensile strength of the fiber decreases from 3000-3500 MP to 800-1000 MP, and to 700-750 MP when producing asbestos-cement items. The modulus of elasticity decreases by a factor of 2.5.

The quality, strength and durability of all types of slate tile and pipe really could be raised if we could manage to preserve the original strength of the asbestos fiber. To do this we need a basic method of changing the technology for obtaining clean, dust free fiber without subjecting the rock to repeated crushing, especially since modern methods exist for splitting fibers using ultrasonics, laser resonance and frequency electro-impulses. Finally, we also need to try chemical methods.

But a lot of research is needed to do this.

It is also intolerable that we lag behind foreign methods of cement grinding technology.

In the overwhelming majority of our plants, open circuit grinding is used. The majority of the developed countries of the world use closed circuit grinding which provides separator units for the grinders. With the aid of separator units, prepared fine-ground cement is directed to silos while larger particles are returned to the grinder. This allows for a 15-17 percent increase in the

productivity of the grinders and 10-12 percent reduction in the energy expended for the grinding.

Installation of such separators in our grinders could be done quickly since the building structures of the majority of modern cement grinding shops are designed for their use.

The creation of a number of compound materials from which surface and deep reinforcement of concrete and asbestos concrete can be produced using various fibers -- glass, polymers and asbestos, is a problem called upon to resolve questions of sharply strengthening products and their durability.

Silica-based manufactured articles differ from metals, polymers and similar materials, for example, in their distinct failure characteristic. First of all, microcracks appear under pressure, then spread and open up, and so-called brittle failure sets in. Investigation into the causes of microcracks and predicting their formation is a complicated, multifaceted task requiring enlisting the services of scientists with different specialities. Resolution of this problem is extremely important since it is the key to raising the quality of many manufactured articles.

There are problems which can and must be resolved in the next few years. The cement industry is poorly supplied with refractory materials, particularly for the clinkering zones of rotary kilns. The average durability of our liners is about 230 days but 400 days abroad. Minchermet [Ministry of Ferrous Metallurgy] has no interest in the creation of special refractory materials for the needs of the cement sector or other sectors of the building materials industry. For this reason, it has become necessary to build a refractory materials plant in the Ministry of Building Materials system.

However, we must bear in mind that the very best refractory materials will serve poorly if the frame of the heat zone of rotary kilns is deformed or if the kilns frequently come to a stop, even for a few minutes. In these instances, loss of the coating, which carries with it part of the refractory masonry when it peels off, are unavoidable. It is also important that the kiln be properly kindled with gradual temperature increases and heat intervals depending on the make up of the refractory material.

National industry output of inexpensive, reliable oxygen devices which have found widespread use in metallurgy opens possibilities for feeding oxygen enriched air into the cement kiln during fuel burning. This allows for reaching the necessary heat zone temperatures while cutting back on fuel expenditure, for intensifying the kilning processes and for stabilizing their control.

The USSR Ministry of Building Materials which provides the country's construction with all types of effective building materials and products is responsible for the technological level both of techniques and these building materials and products.

Particular procedures are strictly observed where sanitary engineering products and polymer building materials are concerned. However, there is one

sector of the industry which, with the ministry's specialized institutes and main administrations at its disposal, practically has no effect on economizing such mass production as precast reinforced concrete. As we know, almost all precast reinforced concrete products are steam cured in imperfect pit dryers whose coefficient of efficiency does not exceed 10-15 percent. Fuel expenditure on thermal processing at 90 kg per cubic meter of product practically has not declined over the course of many years and exceeds calculated expenditures by a factor of 2. As a result, more than 10 million tons of fuel are expended yearly in this country on the production of precast reinforced concrete products.

Builders are raising the question of the necessity of mass producing cement for precast reinforced concrete which would not require steam curing.

As a result of long-term research conducted under industrial conditions, production of two types of rapid setting cement, from which reinforced concrete products which do not require steam curing can be made, has been recommended.

These are sulfation cement, or "bessalit", and cement with crenates added (crystallized additives).

Considering that about 40 percent of the cement produced in this country is used for precast reinforced concrete, in the next few years we must convert 7-10 plants in different areas to production of these types of cement.

Reinforced concrete manufactured from "bessalit" achieves 70-80 percent of design strength over 3-6 hours of hardening under natural conditions instead of the 8-10 hours of steam curing in pit dryers for products made from regular cement.

Production of this building material is suitable for the cement industry since it is fired at a temperature of about 1250 degrees Centigrade. As a result, there is a fuel savings of about 10 percent with an equivalent increase in the efficiency of the kilns.

In the 12th five-year plan, we must resolve the problem of producing crenates which, when added to cement in quantities of 3-15 percent, permit us to obtain concrete with increased strength and reduced setting periods. This really solves the problem of reducing the thermal processing periods for products.

In response to foreign experience, we must conduct research into construction using concrete made from new types of cement. One of the urgent matters which must be completed by 1990 is the feeding of wet production method rotary kilns with hi-tech [technogennyj] products like blast-furnace and ferroalloy ashes and electrothermic-phosphoric slag. Using these products in the raw-material mixture sharply reduces heat expenditure in clinker burning. The practice of using them to partially or completely replace the clay contained in the charge has shown that kiln efficiency increases by 15-20 percent with an equivalent decrease in fuel expenditure.

Expenditures for construction of units to store hi-tech additives and feed them to the kiln will be repaid in a short time.

Mass use of tailings and dibasic products in our industry is suitably discussed in a book by academician V. A. Laskorin and others, published in 1986 by Stroyizdat, and in a brochure by A. S. Boldyrev, A.N. Lyusov and Yu. A. Alekhin, "Utilization of Tailings in the Building Materials Industry", published in 1983 by "Znaniye".

A rebuilt kiln measuring 3.6x71 meters with a de-carbonizing dryer is being used successfully in the Krichevtsementnoshifer P.O. After rebuilding, its efficiency practically doubled and expenditure of fuel was reduced by 10 percent. The kiln would be able to produce more clinker if the slurry feed wasn't limited by the slurry pumps.

We must thoroughly evaluate the work of this kiln and help the plant with pumps.

Analogously, in response to data about an increase in kiln efficiency and decrease in fuel expenditure, we must return also to evaluating the work of the Krasnyy Oktyabr plant kiln which has a "Niro-Atomizer" dryer.

Installation of a dryer is very cheap and is a good solution to raising the efficiency of short kilns which will not be rebuilt for dry-method operation.

Thus we must resolve effectively the problems of increasing production efficiency and the creation and production of new types of cement.

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CONSUMERS SEEK ANSWERS FOR RISING PRICES

Moscow LITERATURNAYA GAZETA in Russian 15 Apr 87 p 12

[Article by Anatoliy Rubinov: "What is Available and How Much Does It Cost?... or: On the Poetry of Life and Prose of Prices"]

[Text] The cost of living continues to rise. Everyone knows that, and everyone is always talking about it. But it seems that only the TsSU [Central Statistical Administration], which is considered to know everything, does not know that. If it did, it would talk about it at least once a year, since it talks even about trivia: how many divorces there were last year in Riga; how many kilometers were added to trolley lines in the country. However, knowledge about divorces in large cities does have its place. Even people who live in a small town which has no trolleys most likely are curious about by how much trolley lines were extended in cities located in other areas and where they are located. But for residents of any town, even a tiny village, it is not only interesting but actually quite important to know the current price index. Saying this in a scientific way, they want to know the present "indicator expressing the relative change in average price level of goods in aspects of time or geographic area." Each one of us is supposed to have money, even if he actually does not. Even if it slips away soon after payday, people still manage to buy something -- in a store, at the market. Thus, it is important for us to know in all "aspects" whether the cost of living is going up and by how much, or do we simply fail to spend our money wisely.

In the final analysis, all of our "heaps of plans" and all of our personal and public accomplishments have the single purpose of making everyone's life better. However, the concepts "better" or "worse" are highly approximate and subjective. This is why we need an objective indicator -- the price index.

The whole world follows a price index, and of course our people are also interested in "what is available and how much does it cost". People have often sent questions in to the editors when they experienced some kind of misunderstanding in a store. The editors naturally transmitted the letters asking about prices to the Goskomsen [State Committee on Prices], which supplied very good answers, ones that were thorough and informative. It is true that the replies sometimes bore the stamp NOT FOR PUBLICATION. Let me ask you, comrades, why someone who works for a newspaper may know about prices, while the public may not? Are people on the editorial staff the only ones who spend money?

And so, because of these replies bearing the restrictive label, the editors have long known that we also have a price index. Incidentally, why should it not exist, since there are many people in our country who know arithmetic! A woman I know has even made a pasttime of arithmetic, even though in the past she never displayed any particular talent for mathematics, a situation which prompted her to take up philology at an early age. For the last 20 years she has been saving the labels from every item she bought and keeping them according to category: children's playsuits, sweaters, etc. She now has a very interesting collection. A veritable museum of prices! It should be used by the USSR State Committee on Prices so that it could say without hesitation how the "prices of goods in the time aspect" have changed. My acquaintance can say exactly how much more expensive the "lodočka" shoes have become in the last 25 years, even though the shoes did not come with a price tag, having a sales ticket. It seems that the "lodočka" ("boat") shoes have sailed a long way on the sea of prices. If the Goskomtsen is in doubt and does not have the necessary figures at hand, I hope that the curator of the domestic museum willingly provides the exact data required. I am also relying on help from readers, incidentally.

It has been written that prices have recently been rising out of proportion to personal income. After the article "Ten Kopecks from Everyone" (LITERATURNAYA GAZETA, 27 March 1985) was published, hundreds of readers pointed out that prices certainly do not rise in steps of 10 kopecks or even a ruble. Then the editors put together an interesting notebook consisting of readers' letters, in which the writers shared their personal experiences of how prices rose for footwear, clothing, baths, barbers, hotels, packaging, transportation, laundry, repairs, theatre tickets, museums, movies, etc. The editors mailed a copy of the handwritten notebook to the place having the most interest in prices -- the authoritative governmental institution that stands guard over prices -- the USSR State Committee on Prices.

However, the editors received neither a thorough nor an informative reply. But many readers who included their home address were rewarded with an official individual reply. They were informed that the Goskomtsen passed their letters on to oblast (kray, republic) governmental organizations for reply. One can draw the conclusion that the Goskomtsen has nothing to do with prices, that this is a matter for the public and oblast (kray, republic) governmental organizations. Naturally, prices did not decrease in the slightest because of this action. Some prices actually climbed the price hill even higher and sailed further away on the sea of prices.

I know about an interesting incident. A senior member of the committee walked into a laundry which had washed his shirts. He was delighted with the excellent quality of work, but dismayed -- let us recognize his unselfishness! -- at how little he was charged. He paid 19 kopecks for each shirt. The senior member started to think, looked up at the ceiling as if to receive information, and announced what he thought the price should be per shirt: 28 kopecks. He most likely looked at the right place on the ceiling and received the right information, since in a month's time all the laundries in the republic were given a new price list containing none other than this figure of 28. It is amazing how fast the senior member of the committee was able to calculate (he is now a

former member, incidentally). He had to consider a great deal of data relative to washing equipment, costs of labor, starch, and ironing; wear and tear of equipment; costs of transportation, steam, heating, lighting, etc. Eye witnesses maintain that while his gaze was fixed on the ceiling, the senior member solved a complex problem in several seconds.

What happened next? The lines in the laundry became shorter soon thereafter. Production won! It started to overfulfill the budgetary plan, since expenses went down for labor, starch, steam, etc., to launder a smaller number of shirts. Who could now say that the laundry showed a deterioration in service to the public if it overfulfills the budgetary plan?

Also, all customers who stopped frequenting the laundry eventually returned. It was explained to them that it had become harder to launder shirts due to their fancier design -- all kinds of small buttons, folds, small pockets, straps. But one question went unanswered: Why was it more difficult and particularly expensive to wash shirts of the older design? Ones that had no small buttons, folds, small pockets or straps? This question was never answered, and customers stopped asking it. What were they to do? Set up pressing machinery in their kitchens and learn how to mix starch and borax to make collars soft and snow-white?

Several months ago, transportation agencies raised their charges for loading and unloading work. Could it be that the freight became heavier or freight-handling workers weaker? Fulfilling the budgetary plan became easier right away, but the number of orders for furniture hauling, such as by Mostransagenstvo, went down. What happened next? The customers stopped using the service. However, as said by a Mostransagenstvo executive: "They got used to it."

They did, indeed! Now people stand in line for this service. What are they to do? Buy a truck cooperatively and look for husky fellows on the street to haul refrigerators to dachas, beds and stacks of books to new apartments?

People who think up new prices always have very good arguments. You can say to them that laundries are now equipped with powerful machinery and automatic devices, that the reports which they supply to their statistical administration indicate that their labor productivity has increased and even become sky-high. With such favorable conditions, why has shirt laundering become unprofitable, according to what we are told? You may say that the trucks carrying the same old things to new apartments are just as powerful as before and the freight-hauling people just as strong as yesterday -- so why the higher prices? Since when has this expensive service been unprofitable? What is the reason?

We can be delighted with the boundless creativity displayed by those people who want to improve their department's indicators not by labor and zeal, but at the expense of the consumer. Given the freedom, they may invent a perpetual motion machine, even though school books say that this is impossible. They have already invented it, by the way. This is the perpetual price raising machine -- the one that keeps pushing prices upward. A comparison with

mountain climbing does not fit here: the climber always descends after completing the climb. This cannot be said about prices, with the exception of -- and this should not even be considered here -- sales of unwanted merchandise, which has to be liquidated at great discount.

About 15 years ago young parents were overjoyed at the introduction of a new service, whereby it was no longer necessary to lay up a supply of diapers by cutting large sheets to size and endlessly washing the diapers. It became possible to rent diapers and then return them, in a used condition, of course. A whole generation of boys and girls grew up wearing state-owned diapers that were rented. How many moving remarks were written about this easing of labor! It was found to be very convenient and completely hygienic; a reasonable cost for parents, a profitable activity for the personal services sector. However, about 2 years ago there came a new rate, which was not accompanied by news of better hygiene, since what had existed was as good as it could be. Then this became profitable for the service sector but exorbitant for young parents. Unless people are helped by well-to-do grandfathers and grandmothers, they cannot make use of this service now. The people who thought up the new price created something you cannot approach very easily. Did they increase prices? Heavens, no! They simply divided the diaper service into parts by introducing new rules which you cannot figure out without developing a headache. What is important is the result: the use of 20 diapers now costs about three times more than before. Why? Because the cloth went up in price? Or packing the diapers by the dozen became more costly? Or maybe the tots themselves are guilty: they started to use the diapers more intensively, with the result that the diapers can no longer be washed thoroughly?

I found it easy to gather facts for this article. There are heaps of facts, no matter which branch you look at. Readers' letters are especially helpful. Some people sent me stories that were downright amusing. Yu. L. Kozlitsinov, who lives in the settlement of Armyansk in the Crimea, asked me to explain why the Titan, a local moving picture theater, which should more properly be called the Rydvan ("Large Coach"), raised its ticket price. Lively correspondence followed -- with the Goskomtsen, the Goskino [State Committee for Cinematography]. This is what developed: Tickets for the Rydvan, that is, the Titan, a fairly run-down theater that needed a good rebuilding, increased in price because the building seems to have been erected to suit the tastes of nobility, having been raised to a Higher Category Moving Picture Theater. Do you know why? Because promises were made to re-equip it with new seats to be delivered and installed in the near future. But what does this have to do with viewers, who sit on the old seats slated for removal? This excuse can be used to raise prices on literally everything -- the trolley, with the promise that airplane-type soft seats with adjustable backs will be installed; meat patties in cafeterias, which will soon be made of steamed beef instead of bread mixture; the train, which is slow, if the promise is made that it will soon fly as fast as an airplane.

It is possible to write a dissertation on the tricks played by the compilers of the new price lists. Their imagination knows no bounds! They use an original method to attain their end every time! How much mental effort they expend to do less work with the hands! Almost every price increase is profitable

for the department, not the government. By its mental effort alone, the department assumes an envious position, offering wonderful indicators and demonstrating its attainments in the form of real money collected from customers, clients, travelers, and viewers. If one is to believe the financial reports, these inventive departments, which are not rebuffed by the Goskomtsen, now offer more and better service. The situation is always the same: at first clients, customers, and viewers are shocked at the price, but then they slowly do indeed become used to it. What is most disappointing about this is the fact that not everyone gets used to it. To become accustomed to it, you must have extra money. Several years ago there was a price increase for work done by tailor shops. Now they have wonderful indicators, if you compare the money they now earn with what they took in before they raised the prices. But the indicators do not give any information on how many people are serviced. After attaining unimaginable financial success, many tailor shops started to produce less and at lower quality. The dissertation could prove that price increases have never led to anything good. Endless increases in prices of crystal produced by then-famous shops were the cause of their closing or at least reduced production of beautiful articles. I was told this in convincing terms -- including figures -- in the USSR Ministry of Trade. The same thing happened with rugs. Now people buy fewer crystal pieces and rugs. Prices were reduced to save the situation, but it was too late: the discounted items ceased to be prestigious. Rugs and crystal are purchased by people who have too much money and do not know what to do with it. Rugs are displayed in the most accessible stores, out in the open, but most people walk by angrily, thinking that it is "too late for such an open display." However, it is amazing that the few people who do not know what to do with their money make up for the indifference on the part of the majority of would-be customers, since the financial results are outstanding! They could lead someone to believe that people are now buying more rugs and crystal.

In analyzing the universal increases in prices of merchandise, service, and travel, I was always amazed at the "artistry" of people who, lacking civic pride, are adept at trading departmental interests for general governmental interests. Even to the point of juggling facts and outright deception. I will illustrate this by citing a relatively minor case.

It really does not cost us much to store luggage at railroad stations, so such a small bit of trickery costing kopecks could be ignored, but it still shows how the price was raised in the case of storing luggage.

In the last ten years, we have come to pay almost 10 times more for the use of the automatic luggage storage lockers. Middle-aged people remember that the locker which was protected by a four-digit combination you thought up yourself cost 15 kopecks for 5 days of use. That was 3 kopecks per day. Very little. That is why travelers came to like those lockers, which became a common sight in railroad stations and piers. Then the railroad people quietly and underhandedly increased the price 2 kopecks, merely changing the labels on the lockers. A piddling amount, 2 kopecks; now use of the lockers cost the same 15 kopecks, but for only 3 days, or 5 kopecks per day. Two years ago they again changed the labels and the rate -- to 30 kopecks for 2 calendar days.

Here we have one price increase done openly and one in secret, in a way that was not immediately noticeable, since you most likely do not know what a calendar day is. You probably think that it is simply two 24-hour periods. Nothing of the sort. If you fall asleep at 10 minutes of 12 midnight and wake up exactly at midnight, the railroad mind considers that you have slept through an entire calendar day and into a second day. This is the hotel situation, so to speak, with its reckoning based on noon. If you arrive at a hotel at 11 am, as of noon you owe the hotel for one day of stay.

Travelers vehemently protested the price increase for use of lockers, but they did not realize that the price had not merely doubled, since they did not understand the meaning of "calendar day." They did not know that the stations introduced a cutoff time, this being midnight, not noon as in the case of a hotel. Most travelers store their luggage less than one day. This is confirmed by local statistics. Each locker box brings in for the Kursk Station 38 kopecks a day, whether you can call this a siderial day or a calendar day. Let us not quibble about the 8 kopecks -- this is a lawful profit for the owner. But the fact remains that one day of storage costs 30 kopecks! The same amount -- not a kopeck less -- you pay if you store your luggage only 10 minutes. That is how the charge was increased tenfold.

The Ministry of Railways justified the hike using various arguments. To begin with, the locker was supposed to have been improved and made more reliable; however, the traveler pays for protection, not beauty. There is no poor storage, since this would be outright thievery! Also, the expense of making new lockers did not increase tenfold or even fivefold. I was told that the purchase price of a locker was 900 rubles, now 1,000 rubles. In each locker there are 10 boxes. This means that the multiple-box locker unit is completely paid for at the Kursk Station, at least, in less than a year, then becoming cost-free and income-producing for the MPS [Ministry of Railroads].

The silent automatic lockers, requiring no food, gasoline, coal, or steam, are an extremely profitable item. On top of that, their importance grows considerably on the very days the railroad is at its worst, when tickets are not to be had and trains are late. Thus, the lockers bring in more income when the MPS is less efficient. At the best station in Moscow -- the Kursk -- the profit brought in by the lockers increases every year. Seven years ago it amounted to 374,500 rubles; 670,000 rubles last year. In 1984, the year of change, when the new rate was introduced, income rose by almost 50 percent: to 646,700 rubles from 463,800. In all these amounts, two-thirds are profit provided by the silent self-service lockers, into which the traveler shoves his luggage without any assistance.

A. A. Kolesov, deputy chief of the Main Passenger Administration, justified the rate increase without making references to higher purchase cost of the locker; he cited another reason. Comrade Kolesov did not suspect that a bulletin written on a ministry form bearing his authoritative signature could be believed. In the communication, carrying the number TsLV-18-3/19, he stated clearly: "The increase in charge for storage of hand luggage is necessitated by profitability of the automatic lockers." A very weighty reason. It seems that the lockers were profitable, "operating" at a loss! Granting that Comrade

Kolesov could forget about his piece of paper, which was posted in November of 1985, I came to him with questions in April of 1987. I found out that Comrade Kolesov simply could not remember whether the lockers bring in money or cause a loss. He shrugged his shoulders and called in an administration colleague for assistance. She was knowledgeable about the matter, but cunning. She claimed that she did not have the authority to disclose secret information and must restrict herself to giving merely the income produced by the lockers as a percentage of the "local receipts" of stations. A fairly stormy argument ensued. In the presence of her chief, the assistant stubbornly defended the state secrets. She was steadfast to the end. Convinced that she serves the country and the people, she proudly refrained from telling me how much people pay to the MPS for this self-service of shoving their luggage into the lockers without any assistance. However, two floors below, in the finance administration, I was willingly told the "secret" figures. In accordance with the plan, all storage lockers -- the manual and the automatic -- are supposed to provide an annual income of something more than 21 million rubles, but they "tried hard" and brought in more than 23 million. One-third of this enormous amount is generated by the automatic lockers, the same ones the charge for which went up tenfold because they supposedly were not profitable!

And so it appeared that Comrade Kolesov, deputy chief of the Main Passenger Administration of the MPS, wrote an untruth in an official numbered communication and put his signature on that untruth.

That is the kind of surprise you come across when you investigate mist-shrouded and sudden price increases. A recent decree issued by the Presidium of the USSR Supreme Soviet stated that there is a shortage of storage lockers in railroad stations. But what sense does it make for the MPS to provide more of them if the charge for the service can be raised so easily? Without so much as informing its billions of riders about it?

And so, the possibility of easily fulfilling the budgetary plan always brings on a worsening in service, in effect a violation of true economic laws.

The question may be asked: Where was the Goskomtsen when the MPS was inflating the prices? The editors asked the Goskomtsen this question, and the committee answered that the USSR Railway Regulations grant the ministry the authority to confirm commission charges and charges for "operations deemed non-essential for the railroads and charges for the storage of baggage." The MPS exercises this authority to the fullest! However, in confirming the prices, it acts in one direction only -- upward. In that case, since the MPS has unrestricted authority to set rates, what is keeping it from making available in stations a combination locker operated by means of, say, an anniversary ruble coin? What could we do about it? We will get used to it. When preparing for a trip, will we just have to assemble a supply of the rubles and let them jingle in all of our pockets.

However, we must ask another question: Why does the Goskomtsen do nothing about it? Why is the Goskomtsen not standing guard over price stability? Government documents issued in the latest five-year periods always contained a paragraph on the need to maintain price stability. Who is to keep track of

this, if not the USSR State Committee on Prices? And why does the TsSU not tell us in its annual reports about how this requirement is being fulfilled in the five-year plan?

Only rarely does the Goskomsen notify the public about a price increase, but it does not hesitate to say what people will receive when discounted hard-to-sell merchandise goes on sale. When warehouses were full of slow-moving goods and it became necessary to get rid of them somehow, the Goskomsen always tried to make it appear as if this was being done for the good of the people, pointing to the millions and billions of savings the people will enjoy if they support the sales. But when it comes to another confirmation of new rates, this time in the Ministry of Communications, which was also given the green light to raise charges for services it rendered and which progressively increased prices of literally everything, this, too, was carried out in the NOT FOR PUBLICATION style. The public still does not know the documentary basis, by whose decision, and when the decision was made to increase the price of the most popular postage stamp by 25 percent. How much did the Ministry of Communications benefit from this? How much did the public lose? Why has the Goskomsen not told us about this? Why does it not tell us in the press -- yes, in the press -- about higher prices for tailoring services, movies, baths, and women's boots, which have risen in price 100 percent in 20 years? Could it be that the Goskomsen thinks that the public is not interested in this? That people are generally not interested in the prose of life and do not want to know what is available and the cost, thinking: "Fie! Such mundane things as prices and money!"

In our dismay over rising prices, we understandably rationalize that this is how the laws of economics work. Raw materials are becoming more expensive. Maybe due to exhaustion of resources or location of sources of supply further away from where they are used; it goes without saying that the price must make up for higher expenses. The same reasoning can apply to higher prices for energy and fuel. But our understanding of the laws of economics is often abused by those who seek an easy solution to fulfilling the budgetary plan, even if their area of activity has no need of more expensive raw materials.

The opposite also occurs: raw materials become cheaper, but prices, well, do not follow suit.

Once again, social control can put an end to the departmental search for price increases by mounting a watch over the material side of life, which involves everyone and manifests itself starting with diapers, as we have seen. It would of course be interesting to know what changes have occurred in the standard of living in all these years, how much it has improved, how much the cost of living has risen.

The USSR TsSU can say that this has already been done, in that it has published a data book which provides an abundance of figures, including data on the "index of state retail prices." These are wonderful figures, and it would be very nice to believe them. Only one thing is wrong: the reader's own experience and a knowledge of elementary arithmetic. All who wrote to the newspaper about price increases -- for personal items, services, slippers, baths --

are told by the data book: "Comrades, you are mistaken; the cost of living has not gone up." For example, leather, fabric and leather-and-fabric footwear has increased in price by a mere trifle -- one-tenth of a percent. Does this mean that women's leather boots which cost 70 rubles 20 years ago now cost not 120, not 140, but 70 rubles 7 kopecks -- an increase of only about 7 kopecks? Please tell us quickly the location of the department store with the prices cited by the TsSU and all women will fly there!

According to the data book, clothing even went down in price -- by 2 percent. But where are those perfectly satisfactory men's suits which used to cost 100 to 120 rubles? They should now be available for 98 to 116 rubles; the garments hanging in stores cost much more.

Middle-aged people can remember that a man's cotton shirt cost 5 to 8 rubles. But now...

At this point, let me get some help from a third party -- the customer. In the final analysis, we are not talking about steel smelting or petroleum production; the greatest authority on prices of goods and services is the consumer himself, the ordinary customer. Let him be the judge. The USSR TsSU maintains that from 1980 to the end of 1985 all goods excluding alcohol showed a price increase of 1 percent. But all the people who wrote to the newspaper about prices cited a much larger figure. Based on my own experience and conversations with acquaintances, I have become convinced that life is becoming more expensive. This is all I hear everywhere I go. It would be interesting to know what people who work in the TsSU think -- not as employees of the statistical institution, but as private persons who wear suits, shirts, "lodochki" and other styles of shoes. It would seem to me that they are the same kind of people that complain to the newspaper about higher prices. If this is so, it is necessary to analyze the technique used by statisticians, who reckon better than we do, of course, but who have invented what to me seems to be a sly approach that allows them to remain honest but still able to figure in a special way, using only one eye, living two lives -- one ordinary, the other statistical.

Statistics always talk about the past; now, when changes are in progress everywhere, the TsSU is harvesting old prices. Let us be kind to the statisticians and the committee in charge of prices and forget previous misunderstandings, agreeing that everything need not be recomputed from the beginning. Let us get a fresh start -- now let them tell us the course of the true price index, starting with, say, 1986. Let us start figuring with that year. An exact accounting is essential, since only honest arithmetic can discourage departmental interest, which has nothing in common with true governmental and general interests. Let us use the statistician's approach, assuming last year's prices to equal 100; then, after the new year sets in, let us be told what the price index is. If it rises above 100, let everyone know which branch reduced our standard of living. With general price monitoring, we will all be in a position to determine who does good work, who does poor work, who works for the good of society, and who works for the monetary gain of a department.

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DEVELOPMENT OF TURGAYSKIY COAL BASIN VIEWED

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[Article by Candidate of Technical Sciences A. I. Vorobyev, of Uralgiproshakht: "The Question of Developing the Turgayskiy Coal Basin"]

[Text] The Turgayskiy Lignite Coal Basin is one of the most promising. The basin is located in the Kustanay and Turgay oblasts of the KSSR. It is adjacent to the industrially developed rayons of the Central and South Urals.

The problem of developing the Turgayskiy Basin has been brought up repeatedly, but for a number of objective reasons, its solution has been postponed, even though the advisability of developing the basin had already been established.

Thus, in 1953 Karagandagiproshakht [Karaganda Planning Institute for Mine Construction] drew up a plan for the comprehensive development of the Kushmurunskiy Field. Subsequently, Uralgiproshakht used this study as the basis upon which to draw up the designs for the Kushmurunskiy Coal Pit No 1 (1954-1955) and the Kushmurunskiy Coal Pit No 3 (1955-1956)

In 1956-1957 Tsentrogiproshakht developed the main points relating to the comprehensive development of the Turgayskiy Basin's lignite coal fields.

In 1965 Uralgiproshakht and Uralgiproshakht completed a technical and economic report on opening up and developing the Ubaganskiy (Turgayskiy) Lignite Basin. The report contained an assessment of the prospects for developing this basin. Somewhat later (1974-1975) Uralgiproshakht, in its role as part of the General Plan for Developing the Coal Industry for 1975, 1980 and 1990 developed a feasibility study on developing open-pit coal mining in the Turgayskiy Basin, and the advisability of developing this area was validated.

In 1979 Uralgiproshakht and TsNIEIuglem [Central Scientific-Research and Experimental Institute for Coal] issued a joint technical and economic report on the effectiveness of using Turgayskiy Basin coals in the country's central regions (in the Urals and the KSSR) instead of Kuznetsk and Kansk-Achinsk coals. But up to now, no practical measures have been taken to develop the Turgayskiy Basin, except for the construction of an exploratory-test coal pit with a capacity of 0.5 million t of coal per year in the Priozernyy Field.

There are at the present time over 20 lignite fields operating with varying degrees of intensity in the Turgayskiy Basin. Of those explored in detail, the Kushmurunskiy, Priozernyy, Eginsayskiy and Orlovskiy fields seem most promising with regard to their reserves.

Coal reserves have been estimated up to depths of 600 m. Most of the reserves (up to 90 percent) are found at depths of up to 300 m.

The basin's overall coal reserves come to 31 billion t, of which 5.9 billion t can be developed by open-pit mining.

Those fields which have at present been exhaustively explored do not comprise the basin's entire prospects. The basin's coal reserves could be substantially increased with more detailed exploration of such depressions as the Dzhanyaspayskiy, the Kyzyltalskiy and the Mkhatorvskiy.

Table 1 presents a brief rundown of the basin's mining and geological features. Almost all the fields' productive formations include 10-30 seams from 0.5-70 m thick, bedded at angles of from 0 to 10 degrees.

1 Показатели	2 Месторождения			
	а Кушму- рунское	б Приозер- ное	в Эгинсай- ское	г Орлов- ское
а Число пластов	8-19	10	3-10	6
б Мощность пластов, м	3-110	30-40	40-80	30-140
в Глубина залегания пластов, м	30-450	30-220	100-380	120-400
г Угол залегания пластов, градус	0-10	0-10	0-10	0-10
д Зольность угля, %	14-19	17-19	14-16	12-16
е Влажность угля, %	35,6	33,6	34,5	34,5
ж Содержание серы, %	2,2-4,4	1,0	2,6	0,5-1,1
з Содержание солей, %				
1 натрия	—	2,64	—	2,88
2 кальция	—	0,34	—	1,81
и Теплотворная способность 1 кг угля, МДж	13,44	13,65	13,65	14,28
к Балансовые запасы угля, млн. т	2785	403	4586	1748

Key: 1. Indicators: а. Number of seams б. Seams thickness in meters в. Depth of seam bedding in meters г. Bedding angle of seams in degrees д. Ash content, % е. Moisture content ж. Sulphur content з. Salts content: (1) Sodium (2) Calcium и. Calorific value per kg of coal in mj к. Coal reserves, millions of tons

2. Fields: а. Kushmurunskiy б. Priozernyy в. Eginsayskiy г. Orlovskiy

The development of the basin's fields is associated with certain difficulties. First, the coal formations in all the basin's fields are bedded at considerable depths and uncovering them requires that a great deal of capital mining work be carried out, which leads to an increased amount of time spent in constructing the coal pits. Second, the presence of such a great number of seams of varying thickness makes it necessary to carry out separate mining operations. Third, the hydrogeological conditions of the basin's fields are

distinguished by considerable complexity, this being determined by the presence of several water tables, which among themselves have a very complicated interconnection; the filtration factor comes to 0.01-10 m/day and more.

The coals of this basin's fields are grade D (long-flame coal) and are represented by humic coals, liptobioliths and sapropeliths. The coals are low ash, with ash contents of 14-20 percent, moisture content of 33-36 percent and sulphur content of 1-6.7 percent. The calorific value of these coals comes to 13-14 megajoules/kg.

Construction of the Kushmurunskiy Coal Pit was begun in 1957 in accordance with a Uralgiproshakht design. This project was put on hold in 1959, since according to calculations made by Tsentrogiproshakht it was thought to be more advisable to shut down the development of the Jushmurunskiy Field and initiate the more intensive development of the Ekibastuz Field. In its 30 years of operation, the Ekibastuz Field has become the primary raw materials base for the power engineering needs of the Urals and Western Siberia. At the present time, this field is the primary supplier of coal the Urals thermal electric power stations, and is being developed at an accelerated pace. The first of four thermal electric power stations with a capacity of 4 million kw has been put into operation, and construction has begun on the second. Naturally, most of the Ekibastuz coals will be burned locally.

We feel that it is necessary once again to return to a more detailed study and to the practical development of the Turgayskiy Basin's coal fields.

Through its studies, Uralgiproshakht has established that 6 coal pits, with productive capacities of up to 120 million t of coal per year could be sited in those of the basin's fields which have been thoroughly explored (see Table 2).

1 Показатели	2 Разрезы			
	а «Кущму- рунский» (№ 1, № 2, № 3)	б «Провер- ный»	с «Эгизай- ский»	д «Орлов- ский»
а Запасы угля в границах разреза, млн. т	2630	360	1490	1050
б Годовая производственная мощность, млн. т	50 (18, 12, 20)	10	35	25
с Коэффициент вскрыши, м ³ /т	4,8	3,8	3,8	3,0
д Максимальная глубина разработки, м	490	210	370	400
е Производительность труда рабочего по добыче, т/мес	570	590	800	770
ф Себестоимость добычи 1 т угля, руб.	4,80	4,50	4,80	3,80
г Срок эксплуатации, лет	60	40	50	45

[Key on following page]

Key: 1. Indicators: a. Coal reserves within the coal pit, millions of tons
b. Annual productive capacity, millions of tons c. Stripping coefficient,
cubic meters per ton d. Maximum working depth in meters e. Labor
productivity per miner, tons per month f. Mining cost per ton of coal, rubles
g. Operational time period in years

2: Coal pits a. Kushmurunskiy (No 1, No 2, No 3) b. Priozernyy c.
Eginsayskiy d. Orlovskiy

With the development of the productive capacities of the coal-pits put into
operation in the Turgayskiy Basin, it would be possible to cut back on
shipments of Ekibastuz coals to the Urals and to establish the Turgayskiy Fuel
and Energy Complex in this region.

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COAL FIELDS FACE NEW MINING METHODS

Moscow UGOL in Russian No 5, May 87 pp 28-30

[Article by V. N. Skuba and F. M. Kirzhner, doctors of technical sciences, and Candidate of Technical Sciences I. N. Los, of the USSR Academy of Sciences Institute of Northern Mining Affairs, Siberian Division, Yakutsk Affiliate, under the "Open-Pit Mining Operations" rubric: "The Prospects for Using a Combined Method for Working the South Yakutia Coal Fields"]

[Text] The opening up and development of the South Yakutia Coal Basin began with the Neryungrinskiy Field, where there is presently a coal pit in operation which produces 13 million t per year, as well as one of the country's largest concentrating mill. The largest construction and power engineering base in Yakutia has also been set up here.

The future direction (projects) for the development of this coal basin will be taken up by comprehensively developing the Denisovskiy, Chulmakanskiy, Yakokitskiy and other fields. This will be brought about by reducing the time spent to construct enterprises, by concentrating mining operations, increasing productivity and cutting back on capital outlays. To do so, new technical solutions are required, which are connected with finding rational production methods and advanced integrated mechanization equipment.

During the initial years of the opening up and development of mining operations at the Neryungrinskiy Coal Pit, a number of complicated problems came to light which were associated with the continuously increasing operational stripping coefficient (from 1.5 to 18.5 cubic m), the deep coal oxidation zone (over 100 m), the complexity of organizing and controlling unique strip-mining and transport equipment, difficult conditions for carrying out drilling and blasting operations, the presence of the water table, the harsh climate and the island frosts.

These things have all reduced the effectiveness with which the open-pit Neryungrinskiy Field has been worked, and they will also have a pronounced effect on improving the effectiveness of coal mining when opening up new prospective fields.

In this connection, the USSR Academy of Sciences Institute of Northern Mining Affairs Siberian Division, Yakutsk Affiliate has been conducting a feasibility

study on the advisability of changing over to a combined method of working the Neryungrinskiy Field, and using an open-pit/underground working method to open up the new South Yakutia coal fields.

Thus, use of the combined method for working the Neryungrinskiy Field (open pit mining along the Moshchnyy Seam and underground working along the Pyatimetrovyy Seam) envisages the winning of additional coking coals, effective draining of the Neryungrinskiy Coal Pit field through the underground workings and collapsed rocks of the maintenance and drainage shaft, using the permanent mine workings shaft to transport the open-pit and the underground coal to the concentrating mill, and filling the worked-out underground mine spaces with overburden rocks.

Preliminary studies carried out by VIOGYeM [All-Union Scientific-Research and Planning and Design Institute for Draining Mineral Deposits, Special Mining Operations, Ore Geology and Mine Surveying Affairs], the USSR Academy of Sciences Institute of Northern Mining Affairs, Siberian Division, Yakutsk Affiliate and the Soyuzshakhtostroy [All-Union Mining Construction Association] Production Association, on using the Pyatimetrovyy Seam workings to drain the Neryungrinskiy Coal-Pit field and on mining more coking coals, indicates that constructing a drainage and maintenance shaft at the Neryungrinskiy Field in addition to the open-pit mine is economically effective.

An investigation of manifestations of rock pressure and rock movement during combined working of the Neryungrinskiy Field and a study of the reciprocal influence of underground and open-pit mine workings have brought us to the conclusion that combined working is technically feasible. We have drawn up four basic technological diagrams showing this method of mining. These diagrams have taken into account the possibility of mining underground faster than by the open-pit method (Figure 1); open-pit mining at a faster pace than underground mining (Figure 2); underground mining directly beneath an operating open-pit mine and underground mining outside the area influenced by the Neryungrinskiy Coal Pit (Figure 4).

Underground mining on the Pyatimetrovyy Seam outside the area influenced by the Neryungrinskiy Coal Pit presupposes the use of open-pit/underground mining. The use of this working method in Kuzbass conditions has been validated in works done at the Institute of Mining Affairs imeni A. A. Skochinskiy (1 and 2). The combined open-pit/underground method in the South Yakutia Field's conditions is feasible in view of its substantial coal reserves (over 25 percent) in those coal seams having favorable bedding conditions. The following are the basic alternatives for using this method in prospective fields: open-pit working of the coal seams followed by a transition to the open-pit/underground method; working the seams with a transition from the open-pit/underground method to the underground method with a corresponding mutual coordination of the mining operations; or working the coal seams only by the open-pit/underground method.

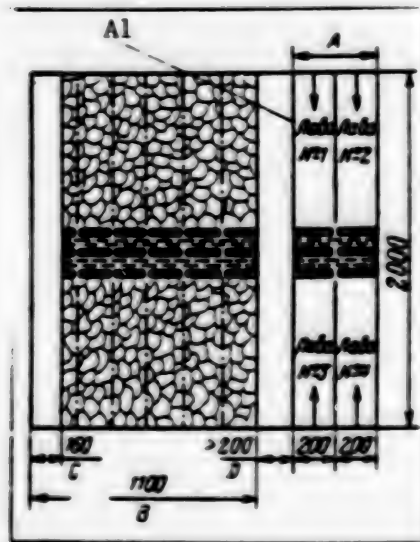


Figure 1. Diagram of underground mining operations proceeding faster than open-pit mining. Key: A--Zone of underground mining of Pyatimetrovyy Seam; A1--Longwall; B--Zone of open-pit mining of Moshchnyy Seam; C--Yearly front of open-pit mining movement along Moshchnyy Seam; D--Safe zone of advance

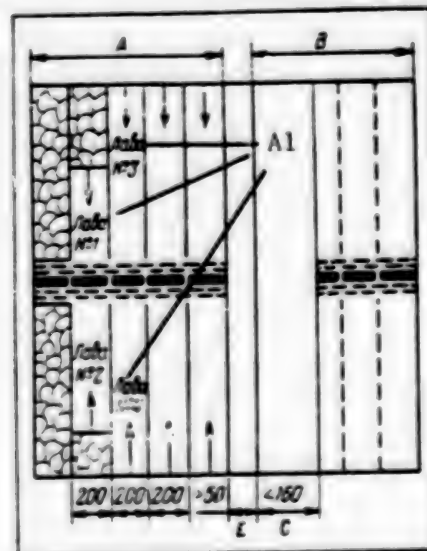


Figure 2. Diagram of open pit mining proceeding faster than underground mining. Key: A, A1, B and C--Same as in Figure 1; E--Safe zone for underground mining to lag behind open-pit mining.

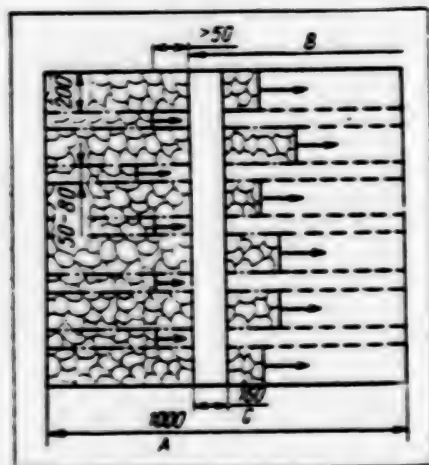


Figure 3. Diagram of underground mining conducted directly beneath an operating open-pit mine:

Key: A, B and C--Same as in Figure 1 and 2.

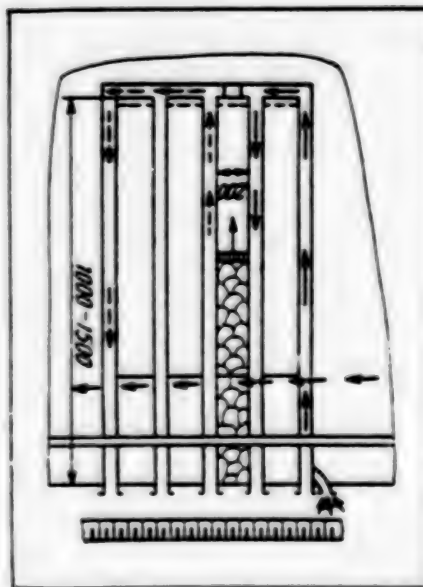


Figure 4. Diagram showing how the Pytimetrovyy Seam is to be mined out, outside the zone influenced by the Neryungrinskiy Coal Pit

Widespread use of the combined mine-working method in South Yakutiya's coal fields will greatly improve the effectiveness of mining in this region. Thus, at the Neryungrinskiy Field alone, the combined working method will improve the coal-pit field's drainage, will yield more of the coking coal used to produce concentrate, and will regulate the volume of stripping work by virtue of the additional coal from the underground workings (within 10-12 million cubic m); underground mine workings can be used to transport not only coal mined underground, but from the open pit mine as well; worked-out spaces in the underground mine can be filled with overburden rock from the open-pit mine.

Using combined methods of working mines at the newly-opened-up field of South Yakutiya, and the open-pit/underground method in particular, will reduce the time needed to put coal-mining enterprises into operation by 2-3 years; will stabilize the work of the enterprises during the changeover from open-pit to underground mining; will create conditions conducive to quickly getting to and mining coking-grade coal reserves and by-passing the oxidation zone; will reduce underground operational losses of coal and will protect the environment. Moreover, this mine-working method reduces coal-mining costs by a factor of 1.3-2, and brings about a 1.5-fold increase in labor productivity by reducing the number of above-ground workers.

The approximate technical and economic indicators comparing the combination open-pit underground mining technique with open-pit mine working in the conditions found in the Denisovskiy Field are shown in the table below:

1 Показатель	2 Открытые горные работы (проект)	3 Открыто-подземные работы
a Мощность вынимаемого пласта, м	2,9-3,5	2,9-3,5
b Годовая добыча угля, %	100	100
c Угол залегания пласта, градус	2-6	2-6
d Способ выемки угля	а Экспаваторы	а Механизированные комплексы
e Средняя численность рабочих по добыче за сутки, %	100	63,5
f Месячная производительность рабочего по добыче, %	100	152,1*
g Себестоимость 1 т угля по предприятию, %	100	60

h * С учетом снижения численности рабочих на поверхности.

Key: 1--Index; 1a--Thickness of seam being worked, m; 1b--Yearly percentage of coal mined; 1c--Bedding angle of seam, in degrees; 1d--Method of taking coal; 1e--Average numerical strength of workers involved in mining, %; 1f--Monthly mining productivity per worker, %; 1g--Production cost per t of coal per enterprise, %; 2--Open-pit mining (plan); 2a--Excavators; 3--Open pit/underground mining; 3a--Mechanized complexes

Thus, using a combined mining method in the South Yakutiya coal fields, specifically the open-pit/underground method greatly increases the effectiveness of opening up new fields in this region, as fewer manpower and material resources are involved when using existing assets and equipment.

FOOTNOTES

1. L. M. Reznikov and S. A. Drannikov: "K voprosu ob organizatsii dobychi uglya otkryto-podzemnym sposobom" [The Question of Organizing Open-Pit Mining Operations]. UGOL, No 6, 1981, pp 24-26.
2. K. Ye. Vinitskiy, A. N. Shukhov and V. V. Kryuchkov: "Razrabotka malomoshchnykh ugolnykh plastov s poverkhnosti" [Working Thin Coal Seams From the Surface]. "Tekhnologiya podzemnoy razrabotki ugolnykh mestorozhdeniy" [Procedures for Underground Working of Coal Fields]. Moscow, 1973. Issue 107. pp 11-17

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INCREASED MECHANIZATION IN COAL INDUSTRY URGED

Moscow UGOL in Russian No 5, May 87 pp 9-12

[Article by Engineer D. M. Yerpylev, of the Gidrougol Association's Nagornaya Underground Mine, under the "Advanced Experience. Socialist Emulation" rubric: "Mechanizing Manual Labor"]

[Text] During the 12th Five-Year Plan period, coal industry workers have major new tasks to solve in order to increase labor productivity. The CPSU Central Committee has approved the patriotic initiative of V. M. Gvozdev's Raspadskaya Underground Mine brigade for increasing labor productivity and for fulfilling the plan for two years of the five-year plan period by the 70th Anniversary of the Great October Revolution.

The example set by V. M. Gvozdev's brigade is arousing all the country's miners to selfless, highly productive labor. Certainly, not all brigades can reach the goals set by V. M. Gvozdev's brigade, but each has been called upon to increase its labor productivity 2-2.5-fold by the year 2000. Production association directors, scientists and machine builders have the task of creating working conditions most favorable to successfully fulfilling the tasks assigned them. The qualitative mechanization of manual labor, as well as the know-how and desire of people to use equipment efficiently is the down payment on increased labor productivity.

In 1967, the Nagornaya Underground Mine took out 1 million t of coal at a labor productivity figure per worker of 52 t/month. It has been decided to reconstruct the mine this year in order to increase the mine's air supply and to reequip the mine, thus increasing its productive capacity to 1.5 million t/year. There were 7 longwalls and 14 development faces being worked in the mine. The planners suggested that with the increased air volumes, the mine would be able to work 10 longwalls and 20 faces, which would also allow up to 1.5 million t of coal to be mined yearly. But the mines engineering and technical personnel and workers believe that mining operations need to be further concentrated, and instead of 7 longwalls they should keep it to 3, instead of 14 preparation faces they should work only 6 or 7, they should greatly increase the load at the longwalls, and use the potentialities made available by the added ventilation factor. This is why in preparing for the 10th Five-Year Plan period, they decided that each face-cleaning brigade would mine an average of 2.5 million t of coal for this five-year period, and that

each development brigade would drive 25 km of tunnel workings. They needed 3 face-cleaning brigades and 3-4 development brigades (2 of which were to be maneuverable) in order to implement this program.

It was decided that manual labor had to be mechanized if labor productivity is to increase. Execution of their plan began with jobs being specialized. Development, face-cleaning, installation and auxiliary sections were formed. A program for eliminating bottlenecks was outlined for each section, after which the mine's engineering and technical personnel and workers began developing attachments and mechanisms directly at the mine site, which helped to mechanize manual labor along the entire working front.

The mine's party committee and technical council have taken it upon themselves to lead all the workers. The technical council has been holding weekly gatherings to find solutions to urgent problems. For example, it had previously taken 30-35 days to remount the KM-81 complexes in the mine. This had to be reduced by up to 7-10 days. Every week, the technical council approved the design resolutions and schemes which had been developed, and which the experimental group used to manufacture attachments, cranes and mechanisms. The tunnel drivers, who are indispensable members of the technical councils, carried out needed jobs in the mine. The face-cleaning miners' brigade for whom the longwalls are so painstakingly prepared, sharply increased the amount of coal they mined. By using this approach to the matter at hand, face-cleaning operations maintained an unbroken regularity for 17 years. By reducing the remounting time by 20 days at a workload of 1000 t per day, the brigade was able to mine an additional 20-25,000 t of coal per month, or 150-200,000 t per year.

In solving the problem of mechanizing manual labor, improving the organization of production, and relying on the creative approach of the engineering and technical personnel and the workers to the business at hand, the program which had been outlined was brought to fruition. During the 10th Five-Year Plan period, each of three longwalls yielded no less than 2.5 million t of coal, and two development brigades drove 73 km of workings. These years saw the development, manufacture and successful utilization of the Kuzbass KN-5N tunnel driving complex, mounting cranes, flowsheets for driving tunnels and remounting complex equipment having a high unit metal content and dozens of attachments. The experience gained from working over many years attests to the fact that basic coal-mining equipment has attained a higher class of reliability, but it has failed to provide a fundamental solution to the problem of mechanizing labor intensive jobs. The PK and GPK tunneling combines, which have been in production for years, have mechanized only two tunneling cycle jobs: coal-cutting and coal-loading (70 percent), and the rest of the miners' jobs are done with sledge hammers and shovels. If measures are not taken to immediately mechanize labor-intensiveness manual labor, the labor productivity for tunnel-driving will not increase during the 12th Five-Year Plan either.

The Kuzbass KN-5N tunneling complex used in this mine, and manufactured from the operative unit of a GPK combine and three KM-87 support sections is a highly reliable and productive machine.

1 Показатель	2 Уровень механизации (ориентировочный), % при проведении выработок комбайнами	
	3 ГПК	4 «Кубасс» KN-5N
a Отбойка угля крепостью $f = 3$	100	100
b Погрузка угля	70	90
c Введение временной крепи	0	100
d Передвижка за комбайном транспортного телескопического оборудования (лента)	0	100
e Крепление выработок	0	50
f Унификация проходческого оборудования с лавным	0	50

Table 1.

Key: 1--Indicator; 1a--Breaking coal with a hardness of $f=3$; 2a--Loading coal; 1c--Erecting temporary supports; 1d--Moving telescoping transport equipment (belt conveyer) beyond combine; 1e--Mounting supports in workings; 1f--Aligning tunnel-driving equipment with longwall; 2--Mechanization Level (approximate), in %, using combines for workings; 3--GPK combine; 4--Kuzbass KN-5N combine;

Table 1. shows the approximate level to which the tunnel-driving cycle has been mechanized when mining workings with the GPK and the Kuzbass KN-5N combines. However, these combines cannot be used in unloading and loading operations, providing automatic combine pressure in a specific direction, working at an angle greater than 15-degree, impregnating the coal massif or drilling degassing holes and equipment shafts.

Figure 1 shows operational drawings of workings mined with GPK and Kuzbass KN-5N combines.

The use of support sections as the base for the combine (see Figure 1, c) makes it possible to always have a temporary support (5) available, to put in roof bolting (4) beyond the combine, to position the unit (3) for drilling blast holes and to position the handle of the crane (2) used for loading and unloading work, to use the combine to move the telescopic belt, as the tension reel (1) travels. Driving workings in this manner makes it possible to integrate the equipment travel, the coal cutting, supporting the working and extending the transport line, and also makes it possible to set up flow-line production instead of cyclic production methods (as when using the GPK combine) and to mechanize a number of processes, all of which will bring about a sharp increase in labor productivity and in tunnel-driving rates.

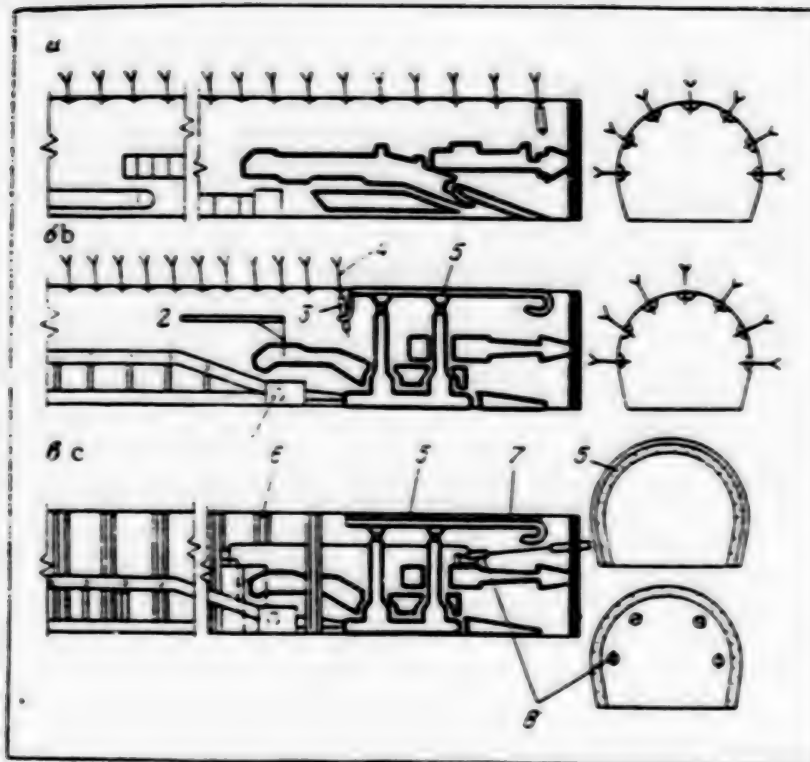


Figure 1. Technological layouts for driving workings:

Key: a--driving workings with a GPK Combine with roof bolting; b and c: using a Kuzbass KN-5N combine to drive workings with roof bolting and fiberglass supports, respectively.

The following improvements can be made in the designs for the KN-5N combine. They will either reduce or eliminate non-mechanized driving of workings:

- combining the temporary support (5) with the device used to form permanent fiberglass supports (6);

- placing a hydraulic or pneumatic TOR (7) [not further identified] between roof and floor to create more uses for the combine's stull unit where roofs are weak;

- preventive impregnation of the coal massif (to strengthen it) with resins, through holes drilled by device (8) mounted on the combine;

- making use of the safety of the stull roof support unit when mounting DKN-1D block sections into the base;

- using the combine to take the tool out of service as a longwall junction support.

Simple, reliable and effective flowsheets for the above have been developed and tested. Using these technical resolutions will increase labor productivity by 30-40 percent.

The mechanization of manual labor when remounting mechanized complexes has tremendous potential for increasing labor productivity. The Nagornaya Underground Mine has been working for years to improve erection and dismantling operations, which are one of the basic coal-mining operations. In the mines, there are complexes in operation whose metal structures comprise 90 percent of the mass of all the equipment in the mine, and if we can completely automate all these operations, then 90 percent of all the equipment will be set up and dismantled mechanically. Up to 60 percent of all delivery operations involve moving the mechanized complex equipment. This very serious problem requires a prompt solution. Table 2 shows the approximate level of mechanization of the labor-intensive operations involved in setting up mechanized complexes.

1 Процессы	2 Уровень механизации (ориентировочный), %	
	3 ВПО «Кузбасс- уголь»	4 Шахта «Нагор- ная»
a Погрузка-выгрузка оборудования на поверхности	90	90
b Доставка оборудования в шахте (исключается доставка волоком)	60—70	100
c Доставка оборудования по камере (исключается доставка волоком)	20—30	100
d Выгрузка оборудования краном	10	100
e Сборка узлов и блоков оборудования кранами	10	100
f Монтаж оборудования кранами в камерах узкого сечения с одновременным расширением камер	5—10	100
g Монтаж блоков электрооборудования, перегружателя краном	0	100

Table 2. Key: 1--Operations; la--Above-ground loading and unloading of equipment; lb--Delivering equipment within the mine (except traction conveying); lc--Delivering equipment along a breast (except traction conveying); ld--Unloading equipment with a crane; le--Assembling equipment units and blocks with a crane; lf--Setting up equipment with cranes at narrow cross-section breasts while simultaneously widening room; lg--Erecting electrical equipment blocks and reloader with a crane; 2--Approximate level of mechanization (%); 3--Kuzbassugol All-Union Production Association; 4--Nagornaya Underground Mine

The use of the simple cranes devised and manufactured by the mine's innovators makes it possible to erect as many support sections during a shift as can be delivered to the longwalls. When this operation is highly organized, some 8

sections of KM supports were erected in 6 hours. The crane, which travels along rails within the chamber, carried out all the operations necessary to unload the sections from the freight truck.

A way has been found to use a cutting combine to transport these sections along a narrow-cut chamber and install them in a room which has been expanded (to the necessary size).

Figure 2 shows a diagram depicting the erection of a mechanized complex.

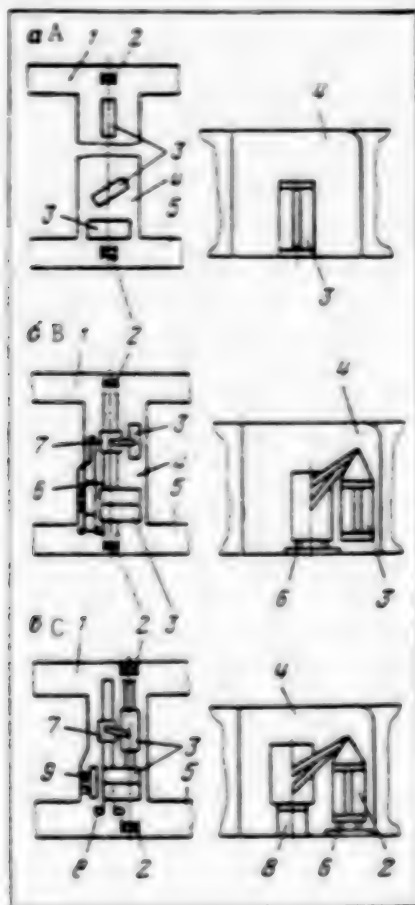


Figure 2. Diagram of erection of a mechanized complex in the Nagornaya Underground Mine.

Key: A--Using winches; B and C--Using cranes mounted on rails and on a conveyer, respectively; 1 and 5--Ventilation gallery and conveyer gate-end, respectively; 2--Winch; 3--Support section; 4--Erection chamber; 6--Rail line; 7--Crane; 8--Longwall conveyer; 9--Cutting combine

The scheme for a double crane installation (see Figure 2, B and C) has been refined and successfully used. From the rail line, the crane first erects the longwall conveyer head, the flight and the upper head, and installs the cutting combine. Then the crane moves to the longwall conveyer and installs the longwall support sections, which are delivered in three blocks. The base, spacer and roof, brought by rail to the crane, are then installed. As the next support section is installed, the cutting combine cuts the next band,

(coalbelt) which is 1.5 m long, so that the next support section can be installed here. The example shown in the figure is that of the erection of a Pioma complex (manufactured in Poland) at longwall 64-18 in the Kusheyakovskiy section. Over a period of 20 days, some 2,000 t of equipment were installed at a 150-m longwall, with all the equipment tested under load during the installation.

Using the mechanisms and techniques which had been developed, the labor productivity was 2-3-fold higher than for traditional methods. However, the substantial lag in finding solutions to problems associated with reducing labor intensiveness during dismantling operations has been reduced.

In order to improve dismantling operations, we need to:

- ensure that the complex is well-suited to make turns without losses in coal taken;

- consider, when developing the complex's design, its potential for being erected and dismantled, which necessitates that the equipment, and the erection and dismantling tools be developed jointly;

- devise equipment for dismantling the complexes, which can be moved without a skid, which will rule out a number of labor-intensive operations;

- mechanize the supporting of mined-out spaces in the areas where support sections are being dismantled;

- create designs for devices for withdrawing support sections in complicated mining-geological conditions;

Coal cutting is one of our most important production operations. However, a considerable portion of this work is done by hand.

Table 3 shows the approximate level of mechanization of labor-intensive operations involved in working mechanized longwalls. We should mention that such jobs as separating the coal from the water right at the longwall or near it, manually cleaning up the coal and rocks (which have fallen on the floor of the sections), and impregnating and degassing the coal massif, remain unmechanized.

Some 4-5 persons per shift work on 90 percent of the mechanized jobs at the longwall. These people produce 1,000 t of coal or more, but it takes 7-8 people to do the remaining 10 percent, or the manual jobs. It is obvious that mechanizing this 10 percent of the manual jobs would raise the labor productivity of the breakage face workers 2-fold.

In order to improve breakage face cleaning work we need:

- to equip cutting combines and the terminal heads of longwall flight conveyers with catchers so that coal can be mined without pits;

- plantstodevise and manufacture mechanizedjunctions along with supports;

to manufacture a reloader mounted with electrical equipment, breakers, and tools for drilling and treating engineering shafts;

to equip mechanized complexes with explosion-proof compressors, which will permit the use of pneumatic hammers and pneumatic ejectors for removing coal and rocks which have fallen onto section floors, and pneumatic pumps for water removal.

1 Процессы	2 Уровень меха- низации (ориентировоч- ный), %	
	3 по завод- ской схеме	4 шахт- отор- ная
a Отбойка угля	95	95
b Погрузка угля	95	95
c Крепление забоя	95	95
d Выемка угля в нише:		
(a) верхней	50	100
(b) нижней	50	100
e Крепление сопряже- ния:		
(a) верхнего	50	50
(b) нижнего	0	0
f Дробление негабаритов	0	80
g Отработка лав пере- менной длины ($\pm 4-5$ м) из-за перемен- ного угла залегания	0	100
h Гидравлическая связ- ка (главный конвейер с перегружателем, пе- регрузатель с леп- точным конвейером)	20	100
i Разгрузочно-доста- вочные работы под лавой и в лаве	20	20

Table 3.

Key: 1--Operations; 1a--Coal breaking; 1b--Coal loading; 1c--Supporting coal face; 1d--Mining coal in stable hole; 1(a)--Upper; 1(b)--Lower; 1e--Attaching junction: (a) Upper; (b) Lower; 1f--Crushing outsized lumps; 1g--Finishing off longwalls having varying lengths (plus or minus 4-5 m) because of a variable bedding angle; 1h--Connecting hydraulic lines (longwall conveyer to reloader, reloader to belt conveyer); 1i--Unloading and delivery work near and on the longwall; 2--Level of mechanization (approximate), in %; 3--In accordance with plant-furnished scheme; 4--Nagornaya Underground Mine

We need to mention that prior to initiating the effort to mechanize the special-purpose sections, stationary factory-furnished and handmade cranes were installed on the surface for offloading cargoes from railcars and motor transport vehicles to mine storehouses or into mine rail cars. In the mine, rail lines were laid to all development and breakage faces, and loads from the surface to their destinations proceeded without reloading. This permitted the mechanization of many jobs previously carried out manually in the mine.

Having jobs concentrated in this fashion, with each brigade responsible for carrying out 30 percent of the mine's plan, has made engineering and technical personnel and workers much more responsible. Workers' professional skills and job knowledge have improved greatly.

During the 9th and 10th five-year plan periods, coal mining output increased from 1 million to 2.2 million t per year, with a 2-fold increase in labor productivity. Some R11 million were saved for renovation. USSR Minugleprom [Ministry of the Coal Industry] authorized the development of the new Kusheyakovskiy Section. With the active participation of the collective, what was essentially a new mine was constructed during 1979-1982. This mine presently produces 1.7 million t of coal per year. For its work during the 10th Five-Year Plan period, the mine collective was awarded the Order of Labor Red Banner. The long-term experience in constantly seeking solutions to the problem of mechanizing manual labor shows that today's miners, like never before, have been provided with powerful tunnel-driving, mining and transport and other equipment, but it is not being used to its full capacity. It is a case of most examples of development, mining, installation and delivery equipment having been developed on an individual basis, without having been sufficiently coordinated with each other in the manufacturing process. This is why equipment malfunctions, disruptions, accidents and downtime occur at the junctures of these processes. A disruption of production rhythm causes a slackening of discipline and work-force turnovers.

In order to sharply improve the interaction of machinery and mechanisms in the mines and most economically involve them in concrete mining and geological conditions, we feel it advisable to set up a Chief Designer's Service for the purpose of uniting the efforts of this sector's planners, machine builders and researchers. This service would be responsible for solving the basic problems of technical progress--from the scientific development stage to the point at which the final results are obtained, which will rule out the need for frequent agreements, will create highly-productive technological layouts in extremely compressed time periods and will allow us to rapidly mine large amounts of coal.

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CERTAIN ECONOMIC INDICES IN OIL DRILLING STUDIED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 4, Apr 87
pp 58-62

[Article by V.V. Belikov, SevKavNIPIneft [North Caucasus State Scientific-Research and Project Institute of the Oil Industry], under the "Economics and Scientific Organization of Production and Labor" rubric: "Several Planning-Evaluation Indicators in Well Drilling"; first three paragraphs are editor's introduction]

[Text] In light of the solutions of the tasks posed by the 27th CPSU Congress and subsequent CPSU Central Committee plenums, an important condition for improving production activity is the correct selection of indicators which characterize the labor intensity of products, and reflect increases in production volume and improvements in product quality.

A previous article in AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO by R.S. Bagiryants and L.R. Bagiryants, "Problem of Evaluating the Labor Intensity and Capital Intensity of Constructing Oil and Gas Wells" (No 2, 1984), discussed problems of improving several indicators of well construction and its main stage, drilling.

In light of the special importance and urgency of this problem, the editors are continuing the discussion of the problems of using basic planning-evaluation indicators for well drilling.

Undoubtedly, one of the most important tasks in converting the economy to an intensive growth track is to improve the evaluation and planning of the production and management activities of drilling and exploration administrations. The solution of a number of problems facing the oil- and gas-producing industry depends on the correctness and speed of fulfilling this task. These problems are: reducing the production cost of a unit of end product, increasing the production volume of this product, improving overall production efficiency etc. A very important aspect of this is the correct selection of planning-evaluation indicators for the activity of drilling organizations.

In this regard, the article of R.S. Bagiryants et al. [1] is of interest. This article proposes that the activity of drilling enterprises be evaluated by the indicator, "number of completed wells transferred to customer." But this proposal is not new. Beginning in 1979-80, a number

of Minnefteprom [Ministry of the Petroleum Industry] associations began using a new system of planning-evaluation indicators for petroleum-industry enterprises. The basic indicators of the system are: the number of wells transferred to customers; the duration of the well-construction cycle and the number of well-days which the wells are in customer possession [2]. The results of implementing the system are discussed in detail in various issues of RNES ECONOMICS OF THE PETROLEUM INDUSTRY.

When discussing the indicators "meterage" and "number of completed wells," article [1] discusses the meterage indicator only from a negative point of view, and the number of wells indicator only from a positive point of view, although, naturally, both indicators have both positive and negative aspects. The authors emphasize that when using the meterage indicator, "there are often cases when, in the rush to fulfill the meterage plan, proper drilling practices are not observed, resulting in accidents and drilling difficulties..."

But won't such violations also occur in the "rush to fulfill the plan" for the number of wells? Moreover, it can be confirmed that, following the logic of the authors of [1], violations will be possible in all stages of well construction, not only in the drilling stage, since all the stages of construction must be accelerated.

Of course, the meterage indicator does not directly take into account auxiliary work, differences in the labor and material intensities of 1 m of drilling at various depths etc. But it must not be forgotten that the meterage plan cannot be fulfilled without performing the auxiliary work (for example, how can you begin drilling without constructing the drilling rig?). Therefore, when establishing the meterage plans for drilling enterprises, auxiliary work is taken into account, as are differences in the labor and material intensities of 1 m of drilling at various depths, etc.

Contrasting the number of wells indicator to the meterage indicator, and using the difference in the labor and material intensities of 1 m of drilling as the negative aspect of the former indicator, the authors of [1], obviously, consider that the wells drilled at a given drilling enterprise have identical labor and material intensities. But, for example, Grozneft PO [Production Association] is presently drilling wells 400 to over 6000 m deep. And, in the race to fulfill the plan for the number of wells, why won't drillers endeavor to complete the shallower wells?

Although the authors of that article consider the negative aspect of the meterage indicator, they still do not indicate the one distinguishing negative feature of this indicator, which is keenly manifested at enterprises which perform deep drilling, with a comparatively long calendar time for well drilling (2-3 years or more). In these cases, the annual meterage is very uneven with respect to depth intervals and, moreover, may be lacking altogether in some intervals.

The meterage indicator has a very important advantage over the number of wells indicator, in that the former reflects the work performed by the

drilling enterprise during the given reporting period (quarter, half-year, year etc.), both in actual and monetary terms; the consumption of material-technical resources [MTR] etc. The number of wells indicator reflects the work and MTR consumption not only of the given reporting period, but also that of the previous period, and the actual work and MTR consumption during the reporting period might be insignificant compared with the previous period.

From the above, in particular, it follows that the meterage indicator can be used as one of the basic planning-evaluation indicators of drilling work when constructing shallow wells (with comparatively short well-construction cycles). As a result of the shallow depth, the difference between the labor intensities for 1 m of drilling in upper and lower depth intervals decreases. In connection with the fact that one drilling brigade constructs several wells per year, the brigade's work structure is evened out. The number of drilling rigs built by the brigade, the number of casing strings emplaced, the number of tested sites etc. can be evaluated conditionally per 1 or 1000 m of drilling. This possibility, under conditions of scientific-technical progress, can have a stimulating effect: any reduction in time expenditures for auxiliary work, especially if the well depths are relatively constant, in the final analysis leads to an increase in the number of completed wells.

In light of the above comments on: 1) the necessity of taking into account the structure of the drilling meterage for the reporting period, and the structure of drilling meterage with respect to completed wells, and 2) the different accounting for work and MTR consumption when using these indicators, a question of great practical significance for deep drilling arises: the minimum analyzable period. However, this question requires separate consideration.

In finishing this analysis of the advantages and disadvantages of the two indicators, the following must be noted. Any natural indicator characterizes the subject system one-sidedly. Therefore, one cannot categorically speak of the advantages and disadvantages of one or another indicator in the absence of formulated system goals, or without taking into account the conditions under which the system functions. Under these circumstances, any argument about the applicability of one or another indicator will be scholastic in nature.

For a labor-intensity coefficient, the authors of [1] use the ratio of wages calculated for 1 m of drilling in the subject (analyzed) interval to that in the first interval; i.e., they express labor intensity through wages, and this contradicts the concept of labor intensity.

One must not agree unqualifiedly with the assumption that the labor intensity of 1 m of drilling sharply increases with depth. In general, this trend is observed. But there are often cases when in certain intervals (stratigraphic subdivisions), the time expenditures for 1 m of drilling are less than they are in overlying intervals. Thus, for the Predgornenskaya Area of Grozneft PO, this indicator had different values for different deposits overlying the second intermediate casing (Table 1). For the second interval (Upper Maykop), the time expenditures for 1 m of

drilling were a factor of 2.45-2.56 less than for the first interval (Chokrak). In the third interval, these expenditures increased, but did not reach the level of the first interval. Only in the 4th interval were the time expenditures for 1 m of drilling higher than in the 1st interval. Similar information is given by a number of investigators [3].

<u>Stratigraphic Subdivision</u>	<u>Time Expenditures Per 1 m of Drilling, h</u>		
	<u>Calendar</u>	<u>Productive</u>	<u>Drilling Work</u>
Chokrak	4.82	4.55	2.35
Maykop:			
Upper	1.88	1.85	0.96
Lower	2.91	2.84	1.73
Foraminifera	8.83	8.04	2.21

Article [1] proposes an original indicator, the "cost" of 1 m of drilling, for use in finance and for evaluating well-construction work. Similar proposals have been made in the past [4], but were not widely adopted. The authors of [1] basically repeat published principles, limiting themselves to only a discussion of the advantages of the cost indicator, and do not analyze the reasons for its limited application. Of course, a partial explanation might be the "mental inertia" of people in the planning-economic services, but we consider that the main reason is the complexity of determining this cost, especially for regions with complicated geological conditions. The same thing will happen when the proposed method of determining the cost of 1 m of drilling is implemented.

Firstly, it is not clear what parts of the estimated cost will be reflected in the new, consolidated estimated cost. Secondly, one cannot agree with the proposal to use the project-estimation documentation for wells of the maximum probable depth as the initial documentation, if only because all the other wells will be significantly shallower and, consequently, the drilling enterprise will receive payment for work not performed. Thirdly, the use of this cost indicator does not finally eliminate the existing normative documents needed for making brief estimates. We also note that the introduction of this cost indicator of 1 m of drilling, in the final analysis, must lead to the appearance of a large number of normative documents, in which the cost of 1 m of drilling must be reflected for individual fields (areas) and stratigraphic formations of all drilling regions in the USSR.

One could continue to describe the shortcomings of the cost indicator for 1 m of drilling, but a detailed analysis of this indicator was not the goal of the present article.

Further, noting that the construction (drilling) of oil and gas wells pertains to capital construction, the authors propose to use the planning indicators for construction-installation organizations [5]. However, they do not consider the specifics of the construction (drilling) of oil and gas wells. In addition, the indicator "total volume of commercial construction product performed in-house (cost of wells transferred to customers...)" is incomprehensible. After all, the cost of wells transferred to the customer

includes the cost of outside services. But even if one understands this indicator as described in the decree [5, p 20], then the question arises of how to eliminate the services of other organizations from the stable estimated well-construction cost proposed in [1].

And finally, we note that when constructing deep wells, the work of the well-construction enterprises unavoidably will be evaluated during most periods according to the indicators proposed by the authors of [1] for cases in which the plans for transfer of wells to customers, total volume of commercial construction product and profit will be insignificant. Thus, one can say beforehand that drilling enterprises, in the final analysis, will have incentives not for end results, namely wells transferred to customers, but for fulfilling one of the stages of well construction.

Conclusions

The indicators meterage and number of completed wells have both advantages and disadvantages. The advantages and disadvantages of an indicator must not be discussed without formulating the goals of the system which the indicator must characterize, or without taking into account the conditions under which the system will function.

It is methodologically incorrect to express labor intensity through wages.

The labor intensity of 1 m of drilling does not always increase constantly with depth: in some cases, it can possibly decrease (sometimes by a factor of several units) in several intervals.

The problem of using stable estimates and norms in the economics of well construction requires detailed analysis, as do the areas of application of these estimates and norms.

The construction of deep wells has no relationship to mass or large-series production, where during the course of a calendar year, information is accumulated on the expenditures to produce one or another type of product at a specific enterprise. Therefore, the system of analyzing indicators in drilling requires improvement, particularly in determining the minimum analyzable period.

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PRESENT, FUTURE ROLE OF S&T SOCIETIES DISCUSSED

Kiev ENERGETIKA I ELEKTRIFIKATSIYA in Russian No 2, Apr-Jun 87 pp 5-10

[Article by A.V. Gritsenko, deputy minister of Power and Electrification, UkSSR, and chairman of the Ukrainian Republic Board of NTOEiEP:
"Capabilities of the Scientific-Technical Society Should Be More Fully Used to Solve Problems of Intensifying Power Generation"]

[Text] Over a year has passed since the 27th CPSU Congress. The country is seeing revolutionary transformations to ensure faster socio-economic development and fuller discovery and manifestation of the potential of socialist society.

The main directions of the restructuring are to unite the achievements of the scientific-technical revolution with a planned economy, to increase constantly the contribution of intensification factors to economic growth, to develop thoroughly democracy and socialist self-management and to renew thoroughly all aspects of life in this country.

In the year following the congress, important measures have been taken to fundamentally transform the material-technical base, and to reconstruct the national economy on the basis of scientific-technical progress.

Power generation and electrification of the economy are important links in the solution to problems of industrial-equipment replacement, and of converting the economy to an intensive and energy-conserving development path.

The UkSSR power system, a part of the USSR Unified Power System, has a total capacity of 52.3 million kW. In 1986, the republic's power plants generated 272.6 billion kWh of electricity.

In the 1st year of the 12th Five-Year Plan, a series of measures provided by the Energokompleks targeted scientific-technical program began to be implemented. These measures provide for further growth of the republic's power-generating bases, and for more efficient sector performance.

At the Rovno and Zaporozhye AES's, 1-million-kW nuclear generating units have been put into service. A series of technical-improvement measures has been taken, including the modernization of 8 generating units with a total capacity of 2,400,000 kW, and the rebuilding of individual components in

200,000-kW generating units at the Voroshilovgrad, Starobeshevo and Zmiyev GRES's. An automated air-pollution monitoring system has been put into industrial service around the Zaporozhye GRES.

Scientific-technical measures have been taken to improve the operation and repair of electrical networks. Some 489 automatic reclosing breakers have been installed on 6- to 10-kV feeders to animal-husbandry facilities. A total of 237 enclosed 10/0.4-kV transformer substations have been put into service for agricultural customers.

At the same time, the performance results of sector enterprises show significant shortcomings and unused reserves. The accident rates at power plants and in electrical and district heating networks have remained at previous levels. Equipment replacement at power plants and network enterprises, implementation of automation and computer equipment and the solution of ecological problems are proceeding too slowly.

Because of the ever more difficult conditions of power generation, as well as the introduction of new equipment and technologies, the engineer has an increasingly important role. Technical progress in each production section greatly depends on the engineer's knowledge, competence and creative work attitude.

Scientific-technical societies aid in the fuller utilization of the creative potential of scientists, engineers, technicians and worker-innovators.

The Ukrainian Republic Board of NTOEIEP [Scientific-Technical Society of the Power and Electrical Equipment Industries] combines 14 regional boards and 547 primary organizations of NTOEIEP, representing 93,177 members.

The organizational and scientific-technical activities of the republic and oblast boards aim to involve scientists and engineers in solving problems of accelerating scientific-technical progress.

For these purposes, work forms such as conferences, meetings, competitions and inspections are widely used. Public creative associations, specialist competitions based on creative plans and creative cooperation between scientists and production personnel are organized. Leading production experience is disseminated.

Every year, the scientific-technical society submits to planning and management bodies hundreds of proposals and recommendations for advances in science and engineering, and for solutions to specific production problems.

Above all, the activity of the scientific-technical society in developing plans for future sector growth should be noted. Once every five-year plan, there is a republic conference on "Modern Problems of the Power Industry," which determines the basic directions of the acceleration of scientific-technical progress in the power, electrical equipment manufacturing and power machine building industries. These same problems have been brought up at plenums of the republic and oblast boards, where proposals are developed for the draft basic directions of the sector's socio-economic

development, and for the formulation of integrated scientific-technical programs.

One new way for the scientific-technical society to influence the formulation of sector technical policy was opened with the establishment in 1983 of the joint scientific-technical council of UkSSR Minenergo [Ministry of Power and Electrification]. This council consists of members of the bureau of the Department of Physico-Technical Problems of the Power Industry, UkSSR Academy of Sciences, and members of the presidium of the NTOEIEP Republic Board.

In 3 years of work, the joint scientific-technical council has considered 12 major scientific-production problems, including problems of: organizing personnel training at AES's, progress in automating processes of diagnosing generating equipment, automating rural electrical networks, reducing electricity losses in networks, improving the quality of electricity, expanding scientific research on problems of centralized heating etc.

The formation of the joint scientific-technical council has aided considerably the faster implementation of recommendations made by scientists, engineers and technicians, since the decisions made are, as a rule, the basis for the corresponding decisions of the collegium, and for orders and regulations of UkSSR Minenergo.

Noteworthy among the many proposals developed and supported by the society are recommendations to: develop pumped-storage hydroelectric power plants, rebuild and modernize power equipment, develop the ASTG-200 asynchronous turbine-generator for the Burshtyn GRES and develop and implement lighting devices with slit light guides.

The society has done much to aid in the fulfillment of integrated scientific-technical programs, in particular by concluding agreements on creative cooperation between co-executors of program tasks.

The over 4000 public creative associations are making a significant contribution to solving specific scientific-production tasks. In 1986 alone, these associations fulfilled 7120 tasks.

NTOEIEP organizations have worked extensively to propagandize and disseminate scientific-technical knowledge. The NTO participates in 49 people's universities of technical progress and economic knowledge at sector enterprises. Annually, over 7000 lectures and reports, and about 1800 seminars, courses and leading-experience schools are organized in the republic.

Among the best primary organizations of NTOEIEP are those of Zaporozhtransformator Production Association; Zaporozhye, Ladyzhin and Tripolye GRES's; Donbassenergo Power Repair Enterprise, Feodosiya Tidal Electric Power Plant; Odessa Branch, Orgenergostroy [All-Union Institute for the Design and Organization of Power Construction]; VNIITElektromash [All-Union Scientific-Research Institute of Electrical Machine-Building Technology]; Yuzhtekhenergo and Rovno High-Voltage Equipment Plant.

The following are actively participating in the work of the republic and oblast boards of NTOEIEP: A.K. Shidlovskiy, academician, UkSSR Academy of Sciences; G.G. Schastlivyy and I.M. Chizhenko, corresponding members, UkSSR Academy of Sciences; doctors of technical sciences A.A. Madoyan, M.Ye. Iyerusalimov, L.V. Tsukernik, V.A. Khristich and Yu.V. Shcherbina; candidates of technical sciences I.S. Kalinichenko, V.M. Tsvyakh, A.G. Prokopenko, A.V. Antonovich, N.F. Ozerney, G.A. Klimenko, N.F. Shevchenko, V.A. Nosachev and G.B. Bukhman and engineers A.L. Baydus, A.M. Shtefan, N.Ye. Shevchenko, S.M. Kachan, G.S. Trofimov, V.I. Golubev, B.Ya. Kostyuk, V.V. Zubashenko, G.K. Voronovskiy, V.F. Pavlyuk, I.I. Golovko, among others.

However, at the 27th Congress of USSR Trade Unions, it was noted that the public scientific-technical potential is still underutilized. This is entirely true of the organizations of the republic NTOEIEP.

Insufficient activity and purposefulness on the part of a number of NTO boards, sections and primary organizations have led to a situation where societies have not fully realized their capabilities of evaluating and preventing negative trends in the development of our sectors, or formulating and executing plans for scientific-technical progress.

The sector has accumulated a number of problems requiring the application of the creative efforts of scientists, designers, engineers, inventors and innovators.

Scientific-technical progress in the electric-power industry is a complicated system, in which many factors are interrelated and exert a considerable influence on one another. The solution of the scientific-technical problems of power-industry growth requires an integrated, interrelated approach to problems of improving the reliability of all stages of power generation, the development and implementation of new equipment and the development of promising directions for scientific research.

The solution of these problems is an area for scientists, engineers, technicians and production innovators to apply their creative efforts.

The basic direction for the development of the republic's power industry remains the construction of new capacity at nuclear electric power plants. The growth of nuclear power brings to the forefront problems of ensuring the reliability and safety of AES's. And here, scientists and engineers must concentrate their attention not only on technological problems of nuclear-power-plant operation, but also on problems of the reliability of power-distribution circuits, improving the reliability of power lines connecting AES's with power systems and other system problems related to the operation of nuclear power plants.

As before, the problem of variable-load capacity is severe. Among the most important problems are: 1) the acceleration of construction of the Kanev and Dnestr GAES's [Pumped-Storage Hydroelectric Power Plants] and of the GES-GAES's of the South-Ukraine Energy Complex, 2) the development and production of solid-fuel-fired equipment with a wide load range and 3) the development of an air-accumulating gas-turbine electric power plant.

Efforts to improve the reliability of power-plant boilers, particularly heating surfaces, must be greatly accelerated. It is especially important to solve problems of the efficient combustion of low-grade coals, including problems of slag-prevention, reducing high- and low-temperature corrosion of heating surfaces and developing high-capacity, compact boilers with fluidized-bed and annular furnaces. Very urgent problems are the development of effective methods of removing deposits from heat exchangers, improving water-treatment equipment and implementing progressive chemical water treatment methods.

An integrated approach to ensuring the operating reliability of equipment can be realized through the establishment of a sector system for diagnosing generating equipment. Efforts to establish such a system were begun in the last five-year plan. The system is conceived as a multilevel system based on computer networks and automated work stations for all levels of process engineers. These paperless work stations will operate as a decision-support system, making maximum use of automatic data entry into the computer system at generating facilities. The main goal for developing the system is to convert from regulated equipment servicing schedules to servicing based on the actual condition of the equipment, and in the final analysis, to establish the prerequisites for programmable operation of sector equipment.

By 1990, local automated diagnostic systems must cover the basic equipment of all generating-unit TES's and 750-kV substations, as well as some of the equipment in 330-kV substations and heating networks.

A decisive factor inherent in all stages of power generation is the human factor. The significant complication of working conditions for all power-industry personnel, the increased cost of human mistakes and the need to improve skills require a new system for personnel preparation and training, based on the wide use of computers. Work has now begun to establish a regional system which will combine: 1) a network of centers to prepare personnel for thermal electric power plants and dispatchers for power associations and electrical-network enterprises and 2) educational-training stations at power enterprises. The program also includes the basic aspects of a sector system of medical and psychophysiological support for operators in professional training and at work; these basic aspects were developed from an initiative of the scientific-technical society.

The realization of these measures will establish a firm trend toward reducing the rate of accidents caused by human error, and will improve the effectiveness of technical and management decisions.

The implementation of technology for repairing energized power lines will improve the reliability of consumer power supplies, ensure the optimum load on power plants and increase the productivity and safety of repair work. The republic and oblast NTOEIEP boards have conducted a number of seminars on this subject, and have published two brochures on leading experience, thus helping disseminate this progressive technology. During the 12th Five-Year Plan, manufacturers will begin producing tooling for repair work on energized equipment, training areas will be established and personnel will be trained to perform this work on power lines of all voltage classes;

all these efforts will be on a large scale. In the future, active, purposeful participation by society members will permit this technology to be widely implemented.

The electricity-consumption automated management system [ASU] being developed is designed to improve the efficiency of energy and capacity utilization. The implementation of this system will replace a large number of people at energy-producing and -consuming organizations who now monitor and tally electricity consumption. This system will also allow more efficient electricity distribution among enterprises and organizations, as well as diurnally. The system will also make possible rapid, technically substantiated prediction of electricity-consumption schedules.

There are a number of problems of developing an electricity-consumption ASU which can be solved through close creative cooperation between scientists, designers, production personnel and equipment manufacturers. NTU organizations must direct their efforts toward establishing this cooperation.

The growth of centralized heating based on technical solutions which are several decades old leads to certain problems, both in the operation of power enterprises, and in providing energy to customers. There are formidable tasks to be solved in: 1) monitoring and controlling the hydrodynamic conditions of heating networks; 2) dispatcherization and telemechanization and 3) the development and implementation of: a) compact and reliable sensors and b) an overall system for monitoring the parameters of a branched heating network.

The time has come to reconsider the concepts for further expanding centralized heating, and to determine the feasible limits for its use. Measures must be carefully studied and then adopted to increase the use of all types of secondary energy sources in various economic sectors, and to expand the use of heat pumps for heating. A broad cross section of scientists and engineers must participate in determining ways to further develop the heating system.

Among the most urgent problems for the power industry are environmental protection and the efficient use of natural resources. During the 12th Five-Year Plan, a series of measures will be taken to: reduce greatly the discharge of polluted waste water, 2) achieve the established norms for limiting permissible toxic atmospheric emissions in a number of large industrial centers and 3) increase by 1 million tons the amount of ash and slag used in the economy. The solution of ecological problems requires the active participation of scientific-technical society members, especially in solving problems of sulfur removal from stack gases, fuel-combustion methods designed to suppress gaseous toxic emissions and the organization of scrubber operation.

Along with the above problems, which involve the intensification of power generation, the scientific-technical societies must give special attention to solving one of the most critical problems: the intensive aging of power equipment.

The measures taken to modernize and rebuild equipment are basically designed to keep it operable, and do not improve the technico-economic performance indicators.

Repeated discussions of this problem in the scientific-technical society show that in order to solve this problem, we must accelerate the development of a redesigned module for the existing designs of main power-plant buildings. This module must include a boiler with a wide load range and the ability to burn low-grade coals.

The NTO must take an aggressive position in the fastest possible solution of this problem, and must establish close creative ties with power machine builders.

The end result of the reconstruction will be determined primarily by the efficiency of the equipment and the effectiveness of the engineering solutions incorporated in the project designs. Therefore, one of the primary responsibilities of the NTO is to conduct expert examinations of reconstruction projects.

Engineers and technicians face a set of problems relating to: improving the quality and reliability of electricity supply; reducing electricity losses during transmission, transformation and distribution and increasing the operating stability of power systems in spite of variable loads and large amounts of power being transmitted.

Much attention must be given to a wide range of problems involving the enhancement of automation at power-industry facilities, and the implementation of a new generation of automated plant technical management systems and hardware.

Only by actively attracting academy and VUZ scientists and specialists from other sectors can effective solutions be found to problems of implementing energy-conserving equipment and technology, and developing and implementing methods of using nontraditional energy sources. The NTO can organize creative cooperation between scientists and production personnel in solving these problems.

The enterprises of the electrical equipment industry face no less difficult problems in the 12th Five-Year Plan. These enterprises must convert to the production of a number of very important types of new-generation equipment, including: a unified series of turbine generators with capacities up to 800 MW; a new series of electric motors with ratings up to 400 kW; energy-efficient light sources; complete equipment with sulfur-hexafluoride insulation; high-voltage electronics; a series of complete, microprocessor-controlled electric drives and standardized robots.

The entire increase in production will be achieved by increasing labor productivity, which in turn is to be achieved by improving technology and implementing robotics systems and flexible manufacturing systems.

The fulfillment of these tasks is a broad field for designers, process engineers and engineers at enterprises, scientific-research institutes and design bureaus of the electrical-equipment industry.

How can NTO organizations more actively influence the solution of the above problems? Above all, the work of NTO organizations must be restructured toward individualization of their activities, determination at each level of subjects to be pursued and the selection of the most effective operating forms and methods for achieving the above goals.

For the society's primary organizations, this pertains to specific production problems, the development and implementation of new equipment and the enhancement of the creative component in engineering work.

The society boards must have data banks on the most important scientific-production problems of enterprises, as well as banks of scientific-technical ideas and developments which are not being widely used. This will make possible the purposeful use of the operating forms of the NTO, and will aid enterprises in implementing scientific-technical innovations.

Among the priority measures to make the performance of society organizations more effective, the most important are those which increase the role of scientists and important specialists. They must be insistently urged to work in boards and sections, and to manage primary organizations. More consultation offices must be opened at society boards.

The staff of the republic board and its scientific-technical sections includes 37 doctors and 58 candidates of technical sciences, as well as technical managers of power associations; scientific-research, design and construction-installation organizations and electrical-equipment enterprises.

The inertia of the traditional doubting attitude toward the capabilities of the scientific-technical society must be broken. A significant proportion of the technical managers of enterprises loaded with current production consider the NTO to be a restraint, and simply do not wish to consider it as a helpmate in realizing equipment-replacement plans.

The scientific-technical society, combining scientists, engineers and worker-innovators of various industrial sectors, can be a catalyst for accelerating scientific-technical progress and a barrier to obsolescence. The society can use its financial capabilities to establish temporary creative collectives and to pay for their services. For this, the rights of scientific-technical societies must be expanded in the present process of democratization of the management of scientific-technical progress.

At the 27th CPSU Congress, it was admitted that the range of problems which governmental agencies can solve with the participation or with the preliminary agreement of the proper public organizations must be expanded. It was also deemed necessary to give these organizations the right in a number of cases to block the realization of management decisions. In particular, fundamental problems of the ecological-economic aspects of

siting new large production facilities, the reconstruction of enterprises, the formation of technical-progress plans and the development of the technical creativity of workers should not be considered without discussion in the scientific-technical society.

At enterprises and organizations, the expansion of NTO capabilities is linked primarily with ensuring that the NTO primary-organization councils actually act as scientific-technical councils. In the final analysis, this is nothing less than a way in which the working collective can influence decisions on problems of accelerating scientific-technical progress.

Such an NTO council must become an enterprise staff, in which the proposals of society members would be concentrated, the most effective proposals determined and measures taken to implement them. In particular, this council, based on each specialist defending the creative plan, could determine the contingent of participants for fulfilling especially important tasks, for which a salary bonus is provided. This in turn will help eradicate formalism in the organization of specialists' competitions.

The reduction in the authority of the NTO in recent years is also linked with the establishment of artificial barriers in the utilization of NTO capabilities, especially publishing and financial capabilities. NTO restructuring is based on the expansion of NTO capabilities and such functions as initiatives, training, information, expertise and solving problems of implementing cost-accounting principles.

To achieve these goals, the traditional operating forms and methods must be skillfully used, and new ones must be sought. In particular, the practice of regularly discussing scientific-technical problems at sessions of the board presidiums should be restored. Possibly, proposals to solve the most important scientific-technical problems should be brought to the attention of the board plenums.

In recent years, target republic competitions have been held to fulfill certain scientific-technical tasks, such as mechanizing and automating production processes, conserving energy resources, protecting the environment, rebuilding and modernizing power equipment, improving the reliability of electricity supply to agricultural customers and expanding the production of electrical consumer goods.

Obviously, the organization of target competitions needs to be improved. The competition tasks need to be more clearly specified. In the future, the means of the society must be used for the competitive development of new equipment and progressive technological processes.

Other things needing improvement are the practice of conducting conferences, meetings, seminars and scientific trips; the organization of creative cooperation and the participation of the NTO in forming and realizing plans for new equipment.

Among the work forms which have proven successful, but which have not yet been widely propagated, are public expert examinations of projects, scientific-technical idea fairs and temporary creative collectives.

Much more attention must be given to openness in society affairs. The activities and capabilities of NTO organizations must be widely disseminated in print. The forms of moral and material incentives for creatively active society members must be improved.

When determining what tasks the republic's Scientific-Technical Society of the Power and Electrical-Equipment Industries will perform in the sharp turnaround in the country's life, the NTOEIEP boards and organizations, following the decisions of the 27th CPSU Congress, must act more decisively and energetically to use the new approaches to ensuring the acceleration of scientific-technical progress.

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CALL FOR QUALITATIVE JUMP IN HEAT SUPPLY TO PUBLIC

Kiev ENERGETIKA I ELEKTRIFIKATSIYA in Russian No 2, Apr-Jun 87 pp 2-4

[Article by B.Ye. Paton, president, UkSSR Academy of Sciences, and V.F. Sklyarov, UkSSR Minister of Power and Electrification: "Public Heat Supply Must Be Brought Up to a Much Higher Standard of Reliability"]

[Text] During the restructuring of the country's power industry, the problem of improving the economic efficiency and reliability of urban heat supply is especially important. There has been a steady and alarming reduction in the reliability of centralized heating systems, due to planning, construction and operational deficiencies, as well as to negative objective conditions for the development of these systems.

These shortcomings were especially evident during the winter of 1986-87. Besides cases which have come to light in which officials permitted irresponsibility, negligence, mistakes and violations during accidents, the purely technical aspects of the present situation must be examined and emphasized.

The present and traditional methods of inspecting heating networks do not guarantee trouble-free operation. In combination with the complicated configuration of networks and the absence of reliable troubleshooting methods, this has led to an increase in the number of customers disconnected simultaneously during an accident.

The enterprise balance of UkSSR Minenergo [Ministry of Power and Electrification] alone contains over 24,600 Gcal/h of centralized heating capacity, which is equivalent to 28,500 MW. These sources supply heat to 47 populated areas, including 16 oblast cities.

The total length of heating mains, which are up to 1200 mm in diameter, is about 2600 km. These mains carry over 70 million Gcal annually, which is equivalent to 81.3 billion kWh.

The energy flows are controlled by over 45,000 large-diameter valves which, as a rule, are not electrically operated. The network is equipped with over 21,000 packed-type expansion joints to compensate for thermal expansion, and is saturated with a large number of pumps, heat exchangers and other equipment.

Thus, in reality, a large heating system has been established and is functioning, without having been actually designed as a system. Rather, it was expanded gradually on the basis of scaling-up and geometric similarity. As a rule, the systems are radial, and most often are located in underground conduits, without priority over other networks. The heating system has not been legally documented either.

It must be emphasized that district heating systems were established without any criteria for optimum development, reliability, automatic controls, measurement and monitoring means, backup systems or diagnostics. These criteria have yet to be developed.

This is a decisive factor in the increasing number of worn-out heating lines needing replacement, despite the subsequent faster rates of line repair and construction. Thus, in 1980, line replacement totaled 22 km out of a necessary 188 km, while in 1986, the corresponding figures were 168 and 208 km.

The following intrinsic problems have accumulated in district heating systems:

the negative influence on the ecology of large cities, due to the consumption by heat and power plants and boiler stations of a large quantity of oxygen, and the discharge of toxic combustion products into the atmosphere;

the enormous water consumption. For example, the water capacity of the Kiev heating networks alone is $39,600 \text{ m}^3$, while the normative losses exceed $1000 \text{ m}^3/\text{h}$;

the basic impossibility of developing high-speed, efficient automatic means of protecting district heating systems by localizing accidents and providing backup service. This is due to the impermissibly large inertia of the systems, when many hours or even days are required to connect or disconnect individual elements;

the necessity of increasing the temperature stresses on lines when regulating the heat-carrier parameters (for example, when the outside air temperature drops to -20 or -30°C , the required maximum heat-carrier temperature is 130°C . This causes pipe stresses and expansion which cannot be achieved during maximum-temperature tests in summer);

the absence of means of individual and group regulation of parameters and heat output, which leads to significant instances of fuel overconsumption and

the excessive complexity of hydraulic conditions, especially in cities with variable topography.

In addition, the operation of heating networks is made extraordinarily more complicated and expensive because of:

the complete lack of modern methods and means of reliably diagnosing heating systems, in order to determine reliably the condition of the piping. Neither the presently used hydraulic tests at design temperature

nor test diggings guarantee that all defects will be found, or that the system will operate reliably even for the heating season. In turn, the impossibility of precisely locating possible damaged areas causes an unjustified increase in repair work. In many cities, there are thousands of kilometers of heating networks, the technical condition of which cannot be reliably determined, and the failure of which is only a function of time;

the difficulties of laying and repairing underground pipelines in large cities with intensive traffic and

the excessive labor intensity of district heating system operation. For example, district heating networks require 1.7- to 2-fold more people than electrical networks of equivalent capacity.

Thus, in the 1930's, the concept of district heating was justified by the economic advantages of cogeneration of heat and electricity using district heating turbines, based on the assumption that the power plants would be located close to the heat customers. In the 1970's, this concept, now the basis for many district heating systems, came into sharp conflict with the reliability of district heating systems in modern cities, and therefore requires a thorough re-examination.

It is entirely obvious that heating-network accidents which shut off heat to tens of thousands of residential customers in winter are impermissible, since these accidents entail enormous social, economic and even foreign-policy losses.

Therefore, the most important task of ensuring the reliable operation of existing district heating systems must be solved primarily by:

fundamentally improving the system of preparing and training personnel, based on the use of computers, and improving the operation and repair of district heating networks;

orienting toward the development and use of progressive design and network solutions;

using more reliable elements and equipment (above all, piping);

improving the quality of construction, installation and repair work;

ensuring the proportional improvement of all links in district heating networks and

improving the organizational structures which operate district heating networks, primarily by establishing emergency-repair services properly supplied with mechanisms and equipment.

Consequently, all possible measures must be taken to ensure the maximum reliability of existing district heating systems.

At the same time, in our opinion, the power industry must establish the necessary prerequisites for a qualitatively new approach to district heating for cities and other populated areas.

These prerequisites are above all linked with the fast pace of development of nuclear energy, caused by the scarcity of organic fuels. Under these conditions, electric heating can be used, while organic fuel is simultaneously phased out of city fuel balances.

Electric heating systems will not have the shortcomings of district heating systems; in fact, they will have advantages in these same areas.

For example, electric heaters have an insignificant effect on the ecology and a minimum water content. In addition, problems of automatic controls, relay protection, parameter regulation, backup systems, dispatching, telemetering and control have been solved long ago in the context of existing electric power systems. These heating systems have no inertia, and minimal time is needed to eliminate failures.

The main thing, which must be especially emphasized, is that this method of heating is incomparably more reliable. Also, massive and lengthy heat disruptions are eliminated, since there is the fundamental ability to provide extremely efficient automatic backup service.

There remains one seemingly very significant argument in favor of centralized district heating networks, namely, the generally recognized efficiency.

Available economic calculations show that to generate, for example, 20 million Gcal of thermal energy (equivalent to 8000 MW of power) for heating, 108 million R must be expended for fuel. To produce the same quantity of thermal energy in electric heaters, power-plant fuel expenditures would total 287 million R. The difference is 179 million R in favor of the traditional heating methods.

However, if one takes into account that:

electric heaters could be used as to regulate power-system frequency and operating conditions, which would improve the technico-economic indicators of existing GRES's by smoothing out load schedules, and which would save about 30 million R per year;

it would be possible to avoid building variable-load power sources (pumped-storage hydroelectric power plants and gas turbine units) of an equivalent capacity, which would save about 90 million R per year in depreciation deductions;

by shutting off the electric heat for up to several hours, it would be basically possible to eliminate emergency situations of reduced-frequency operation involving automatic frequency regulation. This would not be detrimental, because of the heat stored in buildings and structures. It has been reported that reduced-frequency operation caused significant losses in the USSR Unified Power System in 1985 and

this would be, perhaps, the only fundamentally possible way of using nuclear energy to replace organic fuel in the district-heating fuel balance. Taking into account the electricity generated by AES's for electric-heating purposes, a recalculation confirms the very large potential economic advantages of electric heating over traditional heating methods.

The above facts are entirely sufficient to illustrate the illusory efficiency of traditional heating methods.

The significant influence of seasonal changes in heat consumption on the power-system regulation range provided by heating customers must be mentioned. After a conversion to electric heating, it likely would be possible and inevitable that air conditioning could be used widely for residential and public buildings, without additional capital expenditures for electrical generating capacity.

Heat pumps, which are actually reversible air conditioners, can be used for these purposes, thus reducing the electricity consumption for heating by a factor of 2-3. Comfort factors will apparently be of increasing significance in making technical decisions.

Foreign experience eloquently confirms this course of action.

A significant circumstance which will free considerable labor resources in the future is that a single electrical system can deliver energy to heat and other customers. For example, 1780 people from Kiyevenergo PEO [not further identified] service the main heating networks in Kiev, and they ensure that thermal energy equal to 10 billion kWh is supplied to consumers. At the same time, the Kiev municipal electrical networks supply 9.6 billion kWh of electricity to customers, while employing only 1026 people. Thus, the specific labor consumption for the transport and distribution of energy through heating and electrical networks differs by about a factor of 1.7.

Thus, in connection with the special social significance of public heat supply, the reliability of existing heating systems in winter must be guaranteed at any cost by:

establishing optimum organizational structures;

improving the quality of personnel preparation at educational-training centers;

accelerating the development and implementation of modern diagnostic means and

providing thermal networks with the needed financial, material and technical resources.

In connection with the accelerated growth of AES's, real conditions have been established for replacing organic fuel with nuclear fuel in urban fuel balances. Thus, the wide use of nuclear-generated electricity for heating can be proposed as an alternative to centralized district heating.

An effective incentive for the implementation of electric heating systems would be a corresponding reduction in the electricity rates for these heaters.

It is urgent that full-scale research be started in order to: determine the technico-economic efficiency of electric heaters, including heat pumps; correct normative documents; determine electricity rates etc.

The gradual replacement of traditional district heating systems with electric systems is one of the most important tasks facing the power industry. The solution of this task will have important economic, social and political consequences.

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COLLECTIVE CONTRACT STATUTES IN INDUSTRIAL SECTOR LISTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 21, May 87 p 19

[Legal document: "Model Statute on the Collective Contract at Production Sectors of Associations, Enterprises and Organizations"; first two paragraphs are source introduction and bear the title "Collective Contract in the Sector"]

[Text] The USSR Goskonstrud and AUCCTU have ratified the "Model Statute on the Brigade Accounting and the Brigade Contract" as well as the "Model Statute on the Collective Contract in Production Sectors of Associations, Enterprises, and Organizations", the text of which, at the request of the weekly's readers, is printed below.

This Model Statute takes into consideration experience acquired in the application of the collective contract in sectors, shops, and other structural subdivisions of production associations, enterprises, and organizations in Novosibirsk Oblast as well as in certain spheres of the economy.

The present Model Statute is intended for use while taking into account sectoral special features in scientific-production and production associations, combines, enterprises and organizations (1) of production sectors (with the exception of agricultural and construction sectors) as well as in industrial enterprises of nonproduction sectors of the national economy.

1. General Considerations

1.1. The basic purpose of using the collective contract in production sectors is attainment by their collectives of high end results for their labor with minimum labor and material outlays on the basis of strengthening the material interest of workers in raising production efficiency, all-out development of creative initiative, economic independence and socialist enterprise.

The collective contract in production sectors is a progressive method of management based on the use of the advantages of collective organization of labor and its remuneration for end results and intraproduction cost accounting.

1.2. Introduction of the contract in a sector provides for the realization of the following basic principles:

- clear-cut determination in quantitative and qualitative indicators of the end result of operating a sector as a single production collective;

- the establishment of a direct connection between the size of money for remuneration of the collective's labor and the end results of its work. At the same time, the sector's collective is guaranteed payment of the total sum of the wage earned for performing a stipulated volume of work in a given time of specified quality irrespective of the number of workers with which the indicated volume was performed;

- assignment to the contract collective of necessary equipment, tools and gear;

- granting to the collective in performance of an assignment independence in the selection of concrete forms and methods of labor organization, production and management in the sector, use of production capital assigned to the sector and distribution of the collective earnings;

- introduction of incentives for rational use of fixed capital and material resources and introduction of cost-accounting relationships of the contract sector with subcontracting units;

- establishment of responsibility for the collective of the contract sector for timely and quality performance of assignments and for management of the enterprise, shop or other subdivision, for the creation of normal organizational and technical and social and everyday conditions of production.

The relations of the contract collective with management and subcontractor collectives are regulated by the agreement on the contract and other economic planning documents.

1.3. The principal organizational and technical conditions of introduction of the collective contract are:

- the relative organizational individualization of the contract sector and its performance of a technologically completed cycle of operations or output of finished products (of its completed part);

- validity and stability of the planned assignments and norms established for the collective;

- the possibility of timely provision of the contract sector with the necessary raw-material, fuel-power and other material resources, technical documentation and various types of services.

1.4. The introduction of the collective contract is preceded by preparatory work, which includes:

--determination of the principal problems that must be solved by the contract collective as a whole and by the brigades included in it as well as of pertinent technical and economic indicators;

--determination of the limits of the work area of the collective of the contract sector and its vocational skill makeup, taking into consideration the complexity and responsibility of work assigned to the sector;

--refinement or development of a technology for performing the work assigned to the contract collective and accounting and selection of equipment and other technical aids;

--working out and approval of progressive norms of labor and material outlays on a unit of the end product;

--establishment of rules of service, manner of engineering support of the contract collective and rational production ties with related subdivisions;

--development of a system of bookkeeping and effective accounting of the work of the contract collective;

--determination of the obligations and responsibility of officials and functional services for ensuring effective operation of the contract collective;

--working up of documents regulating the employment of the fundamental principles of the collective contract (manner of forming the wages of the contract collective, provisions on wages and bonuses, on the council of the contract collective, on cost-accounting relationships and others);

--carrying out in the collective necessary explanatory work disclosing the objectives of transfer of the sector to the contract, the special features of work under the conditions of the collective contract and so on.

1.5. In transfer to the contract of collectives of production sectors, they include all of the sector's personnel--workers, auxiliary personnel, managers and specialists.

Brigades forming part of a contract sector function on the basis of provisions on brigade organization of labor operating at the enterprise. There may be fully or partially included in them elements of the collective contract and cost accounting (normative outlays of wages and material resources for the end result of the brigade's work, mutual responsibility and others).

1.6. Transfer of the production sector to the contract is done on the order of the head of the enterprise or, on his instructions, the manager of the production unit (shop or other structural subdivision) with the consent of the sector's collective and with the agreement of the trade-union committee.

1.7. The contract collective is headed by the chief of the sector (senior foreman, foreman). His appointment to the position is made while taking into account the opinion of the sector's collective.

On the decision of a general meeting of the contract collective and with the agreement of management and the trade-union committee of the enterprise (shop), election of the manager of the contract collective may be introduced. The manner of election is determined at the enterprise.

1.6. The head of the contract sector relies in his work on the council of the collective which is elected at a general meeting. The council of the contract collective operates according to the procedure designated for councils of brigades and councils of brigade leaders.

2. Planning and Accounting

2.1. Planning of the production activity of the contract collective is a composite part of the sum total of intraproduction planning. Plan assignments and norms established for the contract collective are included in the agreement on the contract and other economic planning documents.

2.2. Computation of plan indicators is done on the basis of progressive norms and quotas of labor and material outlays, taking account of the designated measures for reduction of labor intensiveness, raising the quality of production and improving the use of equipment and material resources.

In the process of concluding a contract agreement (preparation and approval of other economic planning documents), the sector's collective and management of the shop (enterprise) coordinate individual plan indicators and designate concrete measures required for the performance of prescribed assignments.

2.3. Accounting of the work results of the contract sector is done in accordance with normative documents operative at the enterprise with obligatory use of interdepartmental and standard forms of primary and reporting documentation approved by the USSR Central Statistical Administration and the USSR Ministry of Finance. In addition to the standard forms of primary documents (orders, requisitions for materials and the like), personal economy accounts are used.

The operational results of the contract sectors are turned over on a monthly basis by the management of the shop (enterprise) to their collectives and are discussed at general meetings (councils) of the contract sectors.

2.4. Only the complete production of the end products (work) specified by the conditions of the contract are counted in the actual production volume of the contract sector. On the disclosure of defective output due to the fault of the contract collective, indicators of the volume and product list for that period in which the defective output was disclosed are reduced by it.

3. Remuneration of Labor

3.1. Remuneration of the contract collective's labor is done only on the basis of the end result, that is, for a fully completed amount of work, the products manufactured and accepted by the technical-control department or the customer (without counting products that have not passed the technological cycle of production established for the sector).

3.2. The money for the wages of the contract sector include basic pay, formed as a rule according to the pay norms for the end work results from the wage fund and the material incentive fund. In addition, payments are made to members of the contract collective of an individual character as well as those credited in addition to the volume of work performed according to the contract (bonuses for socialist competition, rewarding of winners of competitions and so on).

3.3. Wage norms are determined on the basis of existing progressive labor norms, piece-rate rates as well as wage rates of time-rate workers and salaries of other personnel of the sector (including extra pay for conditions and intensity of work) per unit of produced output (services, work) of the sector expressed in physical, cost or labor indicators (units, meters, tons, rubles, norm-hours and others).

Norms for sectors are established within the limits of the norm or wage fund of the shop (enterprise) as a rule for an extended period of time (year, 5-year period) or for the period of production of a given type of product (work performance). At the same time, provision may be made for their reduction according to the stages of the plan period while taking into account planned growth of labor productivity and reduction of labor intensiveness, first of all as a result of implementation of organizational and technical measures and based on the results of certification of work stations.

The wage norms of a contract collective do not include additional pay and other payments of an individual character (for work at night and overtime, on holidays, up to average earnings, preservation of earnings in cases of performance of state or public duties and pay increases for occupational skills as well as bonuses for socialist competition, awards to competition winners and so forth).

3.4. The money for payment of bonuses to workers, specialists and other categories of employees of the contract sector includes sums for current bonus awards from the wage fund and the material incentive fund. Bonuses are created for the entire contract collective on the basis of single indicators and conditions depending on the attainment of end work results in conformity with provisions operative at the enterprise.

For the payment of bonuses to workers of the collective of a contract sector for economy of material resources, managers of enterprises beginning with 1987, with the consent of trade union committees, may allocate up to 50 percent of the amount of savings of specific forms of material resources (with the retention of the previously established larger sizes of the amount of the savings allotted for the payment of bonuses) without restricting the size of the bonus paid to the contract collective for economy of material resources.

The bonus paid to an individual worker within the limits of the total sum of the bonus money credited to the contract collective is not limited.

Bonuses for rationalization and inventiveness and other one-time bonuses which are paid to workers of a contract collective on an individual basis as well as bonuses credited apart from the amount of work performed according to the

contract are not included in the money for payment of bonuses to the entire contract collective (paragraph 3.2 of the present Statute).

3.5. In the case where the collective of the sector or its personnel have performed work not specified in the agreement on the contract, a special order is made out for it. The earnings due for this work are included additionally in the general collective wage fund.

3.6. Doing over or correction of work for which the contract collective is at fault for deviations from standards, technical conditions and requirements is performed without additional pay or at its expense.

3.7. In the performance of work by a contract sector of a one-time character lasting up to one month, the earnings are paid to the collective on completion and turning over of the work. In the case of extended time periods, a monthly advance within the limits of the planned wage fund for the sector or monthly (by stage) pay while taking into account the actual amount of performed work (manufacture of products). The final settlement is made on completion by the contract collective of work assigned to it, taking into account its quality and the execution of other obligations as well as the money paid in the form of an advance.

3.8. Distribution of collective earnings among the members of the contract collective is done while taking into account the individual contribution of each worker to the total results of the collective's labor.

The manner of distributing the collective's earnings (in proportion to the time worked and the conferred category with the aid of the labor-participation coefficient and others) is determined by a decision of a general meeting of the contract collective.

At the same time, the wages of each member of the collective cannot be below the minimum size designated by the state for the time worked with the exception of cases specified by labor legislation.

In those cases where several brigades are part of a contract sector, collective earnings on the decision of a general meeting (council) of the sector may be distributed among the structural subdivisions of the contract sector (brigades, shifts, links) in accordance with their contribution to the total end work results of the sector. At the same time, the coefficient of labor contribution of brigades, shifts, links determined on the basis of indicators and norms prescribed for them can be used. The earnings formed in this way are subsequently distributed among individual workers of the brigade, shift or link on the basis of operative provisions.

3.9. The size of the labor-participation coefficient of managers and specialists of the contract sector is determined by a decision of the general meeting (council) of the sector on the basis primarily of criteria characterizing the special features of the functions performed by these personnel (ensuring conditions for productive and quality work of the sector and the unconditional fulfillment of safety-procedure rules, prohibition of violations of technological and labor discipline and others). The labor-

participation coefficient established for the sector's managers and specialists may be reduced by the management of the enterprise (shop) with the consent of the trade-union committee for lapses in work.

4. Responsibility of the Collective of the Contract Sector and Management for Observance of Conditions

4.1. The collective of the contract sector and management of a shop (enterprise) carry a mutual responsibility, including material responsibility, for observance of the conditions of the contract incorporated in the corresponding agreement and other economic planning documents.

The sector's collective is responsible for production in prescribed time periods of the planned volume of products (performed work) in the product list and of the required quality; growth of labor productivity (reduction of labor intensiveness); rational use of fixed capital, raw-material, fuel and power and other material resources; observance of labor and production discipline and requirements of labor safety procedures and regulations.

The management of a shop (enterprise) is responsible for the timely presentation to the contract collective of plan assignments, norms, technical documentation; its provision with necessary equipment, gear, tools, raw-material, fuel and power and other material resources and creation of conditions for their good state of preservation; engineering and other services for the sector in accordance with plans and schedules of carrying out the respective work; implementation of organizational and technical measures for raising production efficiency and improving work conditions; assessment and analysis of the work indicators of the contract sector.

4.2. In case of nonfulfillment by management of its functions and obligations resulting in work stoppages, disruption or nonobservance of time periods in performance of work, growth of its labor intensiveness, lowering of quality, overexpenditure of material resources and the like, the collective of the contract sector has the right to present claims to management. The manner of their presentation and examination is determined by the system of cost-accounting claims and sanctions or the agreement on the contract operative at the enterprise.

4.3. The responsibility of the contract collective for nonfulfillment of assumed obligations is realized through a change in the amount of money paid it, compensation for damage in accordance with existing legislation or in some form provided at the enterprise. At the same time, the specific guilty parties bear accountability in the form of reduction of the labor-participation coefficient in distribution of collective earnings, disciplinary punishment and other measures of pressure.

The responsibility of management (functional services) for nonfulfillment of its obligations resulting in stoppages of the work of the contract collective is realized through a reduction in the size (deprival) of bonuses and increases to salaries of the respective managers and specialists, holding back

from them their pay partially or in full for the amount of the material damage according to procedure prescribed by the law and imposition of disciplinary penalties.

At the same time, time periods for the fulfillment of work and other conditions of the contract may be changed for the collective of the contract sector.

4.4. The mutual responsibility of the collective of the contract collective and of the subcontracting subdivisions is established on the basis of cost-accounting claims and sanctions operative at the enterprise.

FOOTNOTE

1. Hereinafter scientific-production and production associations, combines, enterprises and organizations are called "enterprises."

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DECREE ON IMPROVEMENT OF RAILROAD SERVICE

Moscow VEDOMOSTY VERKHOVNOGO SOVETA SOYUZA SOVETSKIKH SOTSIALISTICHESKIKH RESPUBLIK in Russian No 13, 1 Apr 87 pp 164-167

[Decree of the USSR Supreme Soviet Presidium, issued in Moscow on 27 March 1987: "On the Work of the USSR Ministry of Railways to Improve the Organization of Passenger Service and Raise Traffic Safety and Passenger Service Standards"]

[Text] Having heard and discussed the report of Comrade N. S. Konarev, USSR minister of railways, and the co-report of the Transport and Communications commissions of the Council of the Union and the Council of Nationalities, the USSR Supreme Soviet Presidium notes that along with the considerable work being performed in railroad transport to solve national economic tasks, the conditions of passenger service, which has important social significance, continues to be at an unsatisfactory level. This problem is especially acute on suburban service, during the period of mass passenger traffic and on days-off and the days before them.

The ministry is not taking the necessary steps to satisfy the 27th CPSU Congress requirements for the qualitative and complete satisfaction of the population's transport needs and for improving traffic safety and passenger service standards. The positive experience, which has been accumulated by the Belorussian, Baltic, East Siberian, Krasnoyarsk, and several other railroads in solving individual questions in passenger transport operations, is being disseminated poorly in the branch.

During the last 10 years, the travel speed of passenger and suburban trains has decreased. The passenger car and electric train park has grown morally and physically obsolete. The capabilities of the new management conditions and the collective forms for organizing labor are not being sufficiently used. The ministry does not have a long-term program for improving passenger transport and raising the level of the passengers'servicing.

Train delays, which have become a regular event, are inflicting a great deal of damage on the economy and the population. This is causing numerous complaints to the USSR Supreme Soviet Presidium, other central agencies and the mass information media. In 1986, one out of 10 long distance trains arrived at their destination almost an hour late on the average. In this

regard, the vicious practice of officials concealing train delays and distorting state bookkeeping is widespread.

Justified criticism arrives from passengers over the low quality of service. They experience great difficulty in obtaining tickets. At the same time, many trains are sent on their way without being filled, and conditions are created for abuses because of the deficiencies in organizing the sale of tickets and in accounting for empty seats. A considerable number of passengers without tickets are being found on trains during inspections.

The requirements for preparing cars for a trip and for maintaining them in proper condition are often not being observed on the railroads. Cars with defective heating and water supply systems and plumbing fixtures are often included in passenger trains. Cases exist where the temperature drops below zero in cars on passenger and suburban trains.

The amount of services requiring payment that are offered to passengers along the way is extremely low. Many long distance trains are not being supplied with the required amount of bedding, newspapers, magazines, and cultural and welfare items. The existing shortcomings in organizing passenger food service are being eliminated slowly. The limited assortment and poor quality in preparing dishes remain as before. Numerous cases of violations in trade rules exist.

The organization of services in train stations does not correspond to the requirements of the times. Many of them are in a neglected condition and do not provide elementary comforts to the passengers. The work of the inquiry and information services is poorly organized. There are not enough checkrooms. The safety of the passengers' property is not guaranteed in automatic checkrooms, and the administration has no material responsibility for its theft.

The ministry is tolerating a serious shortfall in the reconstruction and construction of passenger facilities. The assets, which have been allotted for these purposes, are not being assimilated. Sufficient steps are not being taken to improve the condition of technical and passenger stations, improve the repair base, and raise the quality of repairs.

The existing scientific potential is not being used effectively in the branch. The development level of passenger rail transport unjustifiably lags behind the achievements of science, technology and progressive experience. High-speed passenger traffic is not being developed. Fundamentally new automatic systems for controlling the movement of trains and the sale of tickets and other achievements of science and technology are being introduced slowly.

One of the largest bottlenecks in the activity of the USSR Ministry of Railways and the administrations of the railroads is the selection, training and indoctrination of personnel who directly provide passenger service. The exactingness and monitoring of their work is low. Instances of violations of work and technological discipline and of a careless attitude toward the performance of their official duties when servicing passengers, are not receiving a highly principled evaluation.

The ministry's enterprises and organizations are slow in improving their cooperation with councils of people's deputies to better the population's transport services, especially in suburban traffic and in the solving of social problems.

The USSR Ministry of Heavy and Transport Machine Building, USSR Ministry of Electrical Equipment Industry, USSR Ministry of Instrument Making, Automation Equipment and Control Systems, and USSR Ministry of Ferrous Metallurgy are not satisfying the requirements of rail transport for electric trains, cars, rails, equipment, other technical systems, and spare parts; and they are raising the technical level of their produced products slowly. The USSR Ministry of Transport Construction is not commissioning passenger facilities in a timely fashion.

The USSR Supreme Soviet Presidium decrees:

1. It is necessary to require the USSR Ministry of Railways, guided by the decisions of the 27th party congress and the January 1957 CPSU Central Committee Plenum, to organize its activity so as to insure the elimination of the shortcomings that have been noted in the present decree. When evaluating the production activity of the railroads and divisions and when summing up the results of socialist competition, it is, first of all, necessary to take the qualitative indicators of passenger service into consideration. It is also necessary to see to it that timetables of passenger and suburban trains are observed, the volume and types of services offered grow, and servicing standards raised; to make workers strictly responsible for the fulfillment of all of the requirements for insuring the safe movement of trains, the quality with which consists are prepared for a trip, their sanitary condition, and the establishment of the comforts required for passenger travel; and to perform work consistently to increase the number of firm trains.

Special attention must be paid to the selection, training, retraining, and indoctrination of passenger transport personnel; the improvement of collective forms for organizing and stimulating their work; and the expansion of democratic principles in the work of labor collectives. With the participation of the central committee of railroad transport and transport construction workers' trade union, the ministry must be more persistent in solving the problems connected with improving the work and living conditions of the branch workers. Utilizing progressive experience, the labor collectives must be directed toward increasing work efficiency and building up the social development funds for providing the workers with housing, children's preschool establishments, medical establishments, and cultural and welfare facilities.

2. The USSR Ministry of Railways should consider the radical improvement of passenger service to be one of the most important avenues in its activity. It must accelerate the restructuring of the work to organize passenger service, using progressive experience and the achievements of scientific and technical progress; the improvement in the management mechanism; and the use of intensive factors and economic management methods.

The necessary order must be introduced into organizing the sale of tickets, especially on mass holidays. It is necessary to expand the introduction of new forms for obtaining tickets that are convenient for passengers, to accelerate the establishment of a common union-wide automated system for controlling the sale of tickets and the improvement of the inquiry and information service, and to improve the work of checkrooms.

Energetic efforts must be exerted toward raising the organizational level of passenger trade and food services on rail transport and the quality of services being provided.

3. The USSR Ministry of Railways must consistently solve questions concerning the strengthening of the material and technical base for passenger facilities, bringing it into compliance with modern scientific and technical requirements; increasing local receipts; and using them in the stipulated amount for these purposes. The USSR Ministry of Transport Construction and other ministries, which are constructing passenger rail transport projects, must eliminate the shortfall that has been tolerated in fulfilling plan targets for the reconstruction and building of terminals, stations and other passenger facilities and carry out their construction within norm periods.

4. The USSR Ministry of Heavy and Transport Machine Building, USSR Ministry of Electric Equipment Industry, USSR Ministry of Instrument Making, Automation Equipment and Control Systems, and USSR Ministry of Ferrous Metallurgy must insure the timely delivery of electric trains, passenger cars, equipment, and rails in the stipulated amounts to rail transport; and improve their quality, technical level, reliability, and durability. They must more fully satisfy the USSR Ministry of Railways requirements for spare parts, equipment and diagnostic instruments.

5. The USSR Ministry of Railways, USSR Ministry of Internal Affairs and the USSR Procuracy must resolutely improve the protection of public order on rail transport and concentrate their main attention on preventing violations of the law and on eradicating bribery, embezzlement, speculation, and other antisocial manifestations.

6. The presidiums of the union and autonomous republic supreme soviets and local councils of people's deputies must strengthen their control over the work to raise the level of the population's transport services, and pay more attention to strengthening the passenger service material and technical base; to improving the trade, every-day, medical, and other services of citizens in terminals and stations and on trains; to solving the social problems of branch workers; and to fulfilling the voters' instructions connected with this.

7. It is necessary to send the present decree and the commissions' materials to the USSR Council of Ministers for the adoption of the required measures, keeping especially in mind the review of the following questions:

Improving control over the organization of passenger service in the country and the quality of servicing passengers;

Finding opportunities for bringing together the delivery periods of technical equipment required for the building of passenger service automated control systems during the current five-year plan;

Accelerating the development and implementation of a series of measures to expand the high-speed travel of passenger trains on the most important sections of the railroads, and building special high-speed passenger main lines in the country;

The prospects for building up capacities for the production of long distance and local traffic passenger cars; providing help to the USSR Ministry of Railways in building special enterprises for feeding passengers;

Strengthening the economic responsibility of rail transport enterprises and organizations for the strict observance of passenger and suburban train timetables and compensating passengers for the material damage caused by the theft of their property from automatic checkrooms.

8. The USSR Ministry of Railways must report on the results of the work performed to carry out this decree before 1 April 1988.

A. Gromyko, chairman of the USSR Supreme Soviet Presidium.

T. Menteshasvili, secretary of the USSR Supreme Soviet Presidium.

Kremlin, Moscow, 27 March 1987

8802

CSO: 1829/185

REPORTAGE FROM ON BOARD SUPEREXPRESS TRAIN

Kiev RABOCHAYA GAZETA in Russian 5 Mar 87 p 4

[Article by I. Vetrov: "Swifter Than the Wind"]

[Text] Leningrad-Moscow-Kiev--The ground wind had rushed about during the night and, although the wind had weakened by morning, the dry frozen snow continued to sew up the rails on which the silvery blue ER-200 express stood.

"Just don't delay its departure," flashed across my mind.

The engineer said as if catching my thought: "We will not be delayed."

Vladimir Brunov is not yet thirty two, but he is already an engineer firstclass and has driven superexpress trains from the first day they began operating. He feels confident and speaks very flatteringly about the consist, which has been entrusted to him and which has already been travelling for two years between Leningrad and Moscow, covering the 650 kilometers in less than five hours.

Besides Vladimir Brunov, there is another engineer on the superexpress — Sergey Kopylov. They completed the same technical school in the same year and, after that, special high-speed engineer courses. Now, they are together on the same machine. Brunov, who took me on a trip, drives the express from Bologoye Station to Moscow; and Kopylov — to Bologoye. This schedule also permitted Vladimir Ivanovich to find a little time to acquaint me with the train. He says: "We have an eight-car consist. The control cabs and cafe bars, where you can get soft drinks, coffee and tea, are located in the leading cars. The attendants are also located in that same car... the shape of this train reminds one somewhat of a jet."

If one thumbs through the pages of fantasy collections that were issued some quarter of a century ago, these super express trains or ones similar to them are depicted in the drawing; however, tickets for the fairytale train are now being sold at ordinary ticket offices.

"Your ER-200, they say, is made entirely of aluminum?"

"Almost. It is made of light alloys that are being used for the first time in our domestic railroad car building industry. The simplification of the body design and its almost complete air-tightness combined with a soft suspension guarantee a smooth ride and considerably reduce noise during travel."

In the cab, the engineer continues: "the panel is very convenient. It is cool here in the summer and warm in the winter. There is an automatic train driver; when you turn it on, it does everything automatically."

The train is equipped with four types of breaks: pneumatic, electropneumatic, rheostat, and magnetic track. With the help of Czechoslovak Tesla firm radio sets, one can call the dispatcher from the cab and talk with any subscriber to the city telephone network in Leningrad and Moscow.

Minutes passed. The commands: "Get ready... close the doors...", sound over the radio set. A toggle switch clicks in the engineers front cab: Pantographs "stick" to the contact wire.

Kopylov touches the control column -- and an electronic robot begins its duties. The express starts up smoothly. Almost no noise is heard from the wheels, and no vibration of the body is felt.

A voice is heard: "Let's shift to third...."

This is the running position. Green figures, which show the movement speed: 140... 160..., appear on an electronic panel along with the time. After another several seconds, the speed is already at 180, and then -- 200. This means almost 60 meters a second, that is, twice as fast as hurricane winds.

It was especially pleasant for me, a former electric and steam locomotive test engineer, to note that I did not experience any unpleasant sensations.

The first thing that I asked the workers in the locomotive service of the Southwest Railroad after returning to Kiev was about the super express trains.

Anatoliy Mikhaylovich Mass, deputy chief of the service, answered: "We still do not have trains like those that connect Moscow with Leningrad -- but we will. True, they will at first travel at a speed of 140-160 kilometers per hour. However, even at these speeds, the length of the trip to the capital will be reduced by three-four hours, and this promises quite a bit of gain."

"Does this mean that all attention will be directed toward the speed of movement?"

"Of course not. Consists of 20-21 cars instead of the previous 16 are already operating now. In the not too distant future, we plan to increase the number of cars in passenger consists to 24. In comparison with the primordial 16-car trains, this will permit an additional 200-300 passengers to be transported on each of these trains. Imagine how important this will be during the summer time when travel reaches a peak!"

"The appropriate locomotives are also needed for such speeds and weight...."

"They exist. There is the ChS-8 series that is produced in Czechoslovakia. Two of these locomotives have undergone check-out tests on the Konotop Division and received a good rain. They are now beginning to operate."

"Thus, the problem has been solved?"

"I would not say that. It is necessary to solve such problems as improving the reliability of the track, build fences along the right-of-way, replace switches, improve the contact wire, and solve a number of other technical tasks."

Be that as it may, the goal has been clearly assigned: Express trains must travel to Moscow and from there to Kiev during this five-year plan.

8802

CSO: 1529/104

STRENGTHENING OF BAIKAL SHORE ROADBED PLANNED

Moscow PRAVDA in Russian 8 Apr 67 p 3

[Article by V. Yermolayev, PRAVDA correspondent: "Baikal's Curved Seashore: Scientists Are Trying To Make the Waves Strengthen the Lake's Shore"]

[Text] Irkutsk--The East Siberian Railroad Administration and the Limnology Institute of the USSR Academy of Sciences Siberian Department have concluded an agreement on creative cooperation. The railroad workers have asked the scientists to advise them on how to strengthen the banks of the lake on the Transiberian Railway's section around Baikal.

The steep and taut waves of this "famous sea" kick up enormous force. The limnologists have established that the formation of the banks and sandbars depends on the amount of soil coming in with the flow from the water basin. An approximately 30-year cycle of variations in the lake's level has been noted. When it is low, material from the erosion of the surrounding mountains accumulates near the shore line and the waves equally distribute it and accurately "build" stable banks and beaches. Part of the solid material slides down deep into the depths. At a high level, Baikal playfully throws out the accumulated soil, piling up mighty ramparts and dams.

Waves often erode the shore. All of this causes heaps of trouble for the railroad workers. At times, they have to struggle against approaching ice also. In the spring, an ice field with a weight of up to 220 million tons begins to move. When it meets the rocks and strongly built engineering structures, 30-meter high ramparts are formed. This pressure once covered the steel tracks near the station of Tankhoy and pushed a freight train from the tracks along with its locomotive. G. Galaziy, the director of the institute and a corresponding member of the USSR Academy of Sciences, says: "At any lake level, the waves move many beach pebbles from the solid rocks along the shore. The broken rocks and rock fragments, which have been moved by the waves, undercut the base of the cliffs, bringing them down and forming canopies and cave grottos. That is why the Baikal cliffs appear very young. A fresh fracture is seen in them as if the mountain had just unearthed itself.

Yes, travelling along the "famous sea", I have always been struck by the "youth" of the sheer cliffs that hang heavily over the very cold dark abyss. It seems that if one had arrived here an hour earlier, he would have been a

witness to the majestic spectacle of the mountains' transformation. You experience such a feeling, for example, on the Ushkanyye Islands, which have been formed from marble and where the Peshonerka Bay exists, and on Olkhon. The Virgin Rock, which has been carved by the wind, waves and cold, stands on its northern end. Pebbles saw at the foot of the mountains, and moisture penetrates into the cracks and fissures. When it freezes, it pulls down the rock, creating image after image on it. This is the way that the rock with the image of the Olkhon masonna originated. A "picture" rock -- the Soguchanskiy lighthouse -- stands near a sheer promontory on the northwest coast. Dark veins are visible in the white quartz. According to legend, a raised depiction of a local deity existed there. An audacious stranger cut it out and took it away. Then, the god himself restored the drawing on the rock....

The stream of solid material, to which the waves give birth, destroys not only the cliffs but also the most impregnable concrete reinforcements. Cribbs and other works sometimes last only a year or two: The pebbles from the crystalline mountain rocks are harder than cement. The reinforced concrete walls look as if a diamond saw had passed over them. People are forced to build breakwaters, protective reinforced cement cribbs and walls again, spending millions of rubles.

Is it not possible to have Baikal itself reinforce the tank where the steel main line has been laid? You see, it has been doing this for millions of years already under natural conditions. Scientists are making observations near the Khyr-Khushun, Yelokhin, Kotelnikovskiy, and Lazorotnyy rapids. The latter one is a boulder and gravel bar. The point of a gigantic hard is turned toward the tank. Lazorotnyy Bay is a natural breakwater protecting a vessel from any waves.

The steep slopes of the Baikal range possess an abundance of solid ore. Using it, the lake reinforces its tanks, preventing them from eroding.

The most stable and extremely distributed form of Baikal tank is the curved seashore. Each arc and bend tame the destructive force of the waves regardless of their fury and the direction from which the wind is blowing. The curve is a self-regulating and perfect system. It ideally distributes the soil arriving in the reservoir and evens out variations in individual sections.

G. Matyashenko, the institute's scientific secretary, explains: "It is a shame that they do not treat these natural complexes carefully everywhere. The Peshonerka Bay is in bad shape."

This is the only place in East Siberia with a positive average annual temperature. A fantastically beautiful curved seashore stretches free and untrammelled between the majestic Bolshaya and Malaya Solnechniy cliffs. A tourist base operates in the famous bay. Thousands of "wild" tourists sweep down on it annually. Such a load is beyond the curved seashore's strength. The guests steal all of the colored pebbles for amulets. Beyond the Red Rock near Kedrovyy Pass, they have burned down and felled the forest for campfires, and they have destroyed the very rare "tilted" trees. The wind

blows the sand from under their roots and the trees stand as if they were on stilts....

The forest is thinning out — soil erosion is increasing and the sand dunes are slipping into the water. In order to save what remains and to restore even only part of what has disappeared, it is necessary to transfer the tourist base to the neighboring Khargino Stream valley where the rocky bank is stable.

A recent event in the Malyy Sea was alarming. A suction dredge of the East Siberian River Steamship Company wrecked two coastal sand bars opposite the Naryn-Khushun and Oto-Khushun which deposited sand with their breakers for centuries. Nizhneangarsktransstroy [Lower Angara Transport Construction Administration], which is quartered in the Northern Baikal Trust, needed tens of thousands of tons of gravel and sand. The Olkhon rayispolkom permitted Baikal's two sand bars to be cut. There is now a law suit between the steamship company and the trust. The latter is rejecting the sand and gravel mixture: They say that it is not suitable for asphalt concrete. The solid agents have been wasted for nothing, and appreciable damage has been inflicted on the lake. The trouble does not only lie in the ruined beauty of the capes. The system of sand bars and banks was also disturbed here.

B. Lut, manager of the lake hollow paleolimnology and morphology laboratory, says: "We are also taking this sad experience into consideration when performing research for the railroad workers."

He and Ye. Karabanov and V. Fialkov, candidates of geographical sciences, have been studying the dynamics of the shore and the history of the reservoirs for a long time. The Tunkinskaya and Barguzinskaya valleys, which the Irkut River carved out, were also filled with water approximately 10 million years ago, the scientists assume. The depth of the Barguzinskoye Lake reached one and a half kilometers, only slightly yielding to Baikal. The knowledge accumulated is helping specialists in today's concerns.

It has been decided to add granite gneiss and other hard crystalline rocks from the Angasolskiy Crushed Rock Plant quarry to the shoals near the Kiyuyevka-Mysovaya and Pereyemnaya-Mishikha spans. They will suppress the waves, protecting the shore structures.

However, will these rocks and the residue of blasting, with whose help the mountain mass is being mined, not have an influence on the life of the bottom organisms and the purity of the water?

The limnologists have been called upon to give the answer when they have carried out their chemical, biological and lithodynamic research. Specialists from the Black Sea Department of the Central Scientific Research Institute for Maritime Shore Protection Structures and from the Kazakh Affiliate of the Gidroyekht [All-Union Design and Scientific Research Institute imeni S. Ya. Zhuk] institute will help the Siberians. They will prepare the design for the construction of a protection dam near Baikalsk. The taiga will become dry in the Khamar-Dabana spurs because of the gas emissions from the present

cellulose and paper combine. That is why the streams are gathering strength. It is necessary to tame them....

The limnologists have conducted their first observations on BAM [Baikal-Amur Main Line] between Severobaykalskiy and Nizhneangarskiy. The poured structures there are in their seventh year. A control section from the Cape of Rytogo to Kotelnikovskiy has been selected for comparison. Divers and SCUBA divers will also study the peculiarities in the movement of solid material along the bank. If the results turn out to be good, the "famous sea" will itself begin to strengthen its banks along the entire section of the Transiberian Railway around Baikal -- from Kultuk to Posolsk.

8802

CSO: 1829/184

NEW MOSCOW METRO STATION STARTED

Moscow PRAVDA in Russian 17 Apr 87 p 6

["Chekhovskaya Is Next"; first paragraph is PRAVDA introduction]

[Text] The first cubic meters of track cement will be poured in a day or two at the Moscow Chekhovskaya subway station.

... Four warning signal bells and the cage elevator begins a smooth descent. The track lies there in the shaft at a great depth. There are three of us in the cage: B. Fedyuney, Mosmetrostroy [Moscow Subway Construction] deputy chief engineer; M. Shkalev, SMU [Construction and Assembly Administration]-14 chief engineer; and our correspondent outfitted as a regular subway builder - safety helmet, work clothes, padded jacket, and rubber boots. Rails are under foot: the elevator takes not only people but also industrial cars with centuries-old rocks up and with cement and construction material down.

Fedyuney says in the cage's semidarkness: "The Chekhovskaya complex is one of the most complicated junctions now being built by Metrostroy although the station is, in principle, a typical one -- 160 meters in length. The side tunnels are intended for eight cars -- maximum"

We walk along the narrow track. In front of us, M. Shkalev confidently orients himself in the underground labyrinths, splashing the water with his boots.

Here is the center of the chamber. True, the chamber itself still does not exist. There is the tunnel whose walls and ceiling are "covered up" with tubing and cast iron structures. It would easily have room for ... a three-story building. A ramp, or -- speaking in passenger language -- a platform is now being installed in the track tunnels. When the ceiling, which will conceal an entire underground city of service rooms from the passengers, is fully completed, the tunnel's height will be reduced more than twofold.

Insulation work is now being performed in the side tunnels -- in the left one -- by A. Zyat'yev's brigade, and in the right one -- by N. Akimov's brigade. The lining of the track walls is taking place right now.

A loud clap rang out not far off, another, a third.

B. Fedyuney explains: "The blasters are working. We are located directly under Pushkinskaya Square. The closeness of two operating stations -- Pushkinskaya and Gorkovskaya -- in the construction zone has appreciably complicated drilling and blasting work. Instead of placing several large charges, it was necessary to 'exchange' them for a series of small ones. In this respect, a great strain was, of course, placed on the drifters."

As if in answer to the claps, pneumatic hammers began to knock and chatter away. The drifters had come to replace the blasters.

B. Fedyuney continues to talk: "In general, the major portion of the rocks were -- as they say -- taken away on our shoulders. The driving of the three main tunnels has been completed."

Here is the entrance hall. The noise of trains is heard. Gorkovskaya Station is literally two steps away -- behind a thin aluminum partition. It is opened at night when the city is sleeping and the subway is "under lock and key" and granite slabs and escalator items for the platforms are delivered to Chekhovskaya.

Decorative work is now being performed in the entrance hall that connects Chekhovskaya and Gorkovskaya. Under the direction of foreman N. Mukhin, metal workers are strengthening the watertight hood, and K. Slonov's brigade is laying the granite floor... the tunnel is being transformed meter by meter.

I had met with the authors of the station's design before going underground.

One of them, A. Bigdorov, smiled: "Do you want to look into the future? There is nothing simpler. The design is in front of you."

... We are walking along Strastnyy Boulevard. Next to the Rossiya movie theater is the familiar letter "M." An underground passage had connected this subway entrance with another built in a building on the opposite side of the road.

A small separate tunnel section -- there will be rows of shops here. A spacious entrance hall with suspended ceilings. Here is the station itself. It seems a palace!

I hear the explanation: "Under our feet is Karelian granite which the geologists call 'Renaissance'; it is from the Lyangarskiy deposit in Uzbekistan. The dark gray squares are drawn on a lighter background. It's as if we were standing on an enormous chessboard. Fantastically "curved" columns are dressed in snow white Koelga marble brought from the Urals. The track walls are faced with Uzbekistan Gazgan. Nature has adorned this marble with rust-colored spots. After certain intervals, there are mosaics.

An artistic decorative panel is on the facing walls of the central chamber. On one side is Anton Pavlovich Chekhov and on the opposite one is the writer's home in Moscow. The artists were the married couple P. and L. Shorchev.

A fundamentally new plastic watertight coating is on the walls instead of the usual layer of plaster. Chekhovskaya will become a testing ground for this innovation, and the heavy dirty work of the decorators will be quite something else. They will be able to build in white smocks....

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CSO: 1829/184

BRIEF

KIEV METRO STATION--The final stage in the construction of the new Leninskaya subway station has begun in Kiev. It is planned to put it into operation for the 70th anniversary of Great October. It is being constructed in the center of the city at the intersection with the already operating Svyatoshinsko-Brovarskaya Line between the stations of Kreshchatik and Universitet. [By N. Viktorov] [Text] [Moscow IZVESTIYA in Russian 8 Apr 87 p 3] 8802

CSO: 1829/184

LEGAL ASPECTS OF SHIPPING SAFETY DISCUSSED

Moscow SOTSIALISTICHESKAYA ZAKONNOST in Russian No 3, 1987 pp 18-20

[Article A. Baranov, senior procurator of the Division for Supervising the Execution of Laws in Transportation of the RSFSR Procurator's Office: "Why Is Safety of Shipping Not Assured?"]

[Text] Inspections conducted recently in the local areas and in the staff of the RSFSR Ministry of the River Fleet and analysis of the materials that has been gathered make it possible to draw certain conclusions about why the situation is unsatisfactory when it comes to safety of navigation of river ships through the internal waterways of the republic. The main conclusion is this: throughout the system of the RSFSR Ministry of the River Fleet (minister--L. Bagrov) they underestimate the importance of the strictest observance of safety of shipping, and the role of the services for safety of navigation and shipping inspection is clearly too small. Numerous examples show the powerlessness of these agencies in many situations and the actual impossibility within the framework of their authority of exerting an influence on the managers of enterprises who are acting to achieve personal goals to the detriment of the safety of shipping.

Thus at the beginning of 1986 the shipping inspection of the Volga Basin sent the management of the Bolga Combined River Steamship Line (chief--I. Shepetov) a statement in which it suggested considering the question of whether or not 31 fleet commanders who had allowed serious violations of safety rules were qualified for the positions they hold. The administration of the steamship line took no measures against 19 of the navigators and three of them were promoted. Such an irresponsible attitude has contributed to a situation where six commanders indicated in the statement during last year's navigation period again committed gross violations that caused emergency situations. In this same shipping line in 1986, for violations of safety rules the shipping inspection team gave more than 160 navigators first and second tickets, and about 40 of them--third tickets. But the managers of the steamship line failed to analyze and generalize all these facts properly, did not reveal the causes and conditions for the violations, and did not draw the corresponding conclusions. Preventive work here at best amounts to investigating emergencies that have already occurred and punishing the guilty parties.

A similar attitude toward questions of safety is observed on other shipping lines. On the Belomorsk-o-Onega (chief--Ye. Vasilyev), for example, there have been repeated emergencies with ships under the command of the same people.

The managers of the shipping lines and enterprises simply do not know about many violations of safety rules of shipping that have been revealed by shipping inspections. During 9 months of 1986 the Yenisey Shipping Inspection reveal 240 violations, and nobody was aware of many of them in the services of the shipping line or the basin shipping administration.

The steamship lines do not give a careful evaluation and do not systematically check on and analyze situations when an emergency has been presented or alleviated, even though there has been a threat to the safety of navigation and the preconditions for the appearance of an emergency have existed.

Because of the numerous deviations and violations of the established policy for investigating emergencies, the amounts of losses are determined incorrectly. These cases are incorrectly classified, and the reports and the real safety picture are distorted. Frequently the consequences of an emergency make it necessary to put ships into dry dock--a most costly operation that involves bringing the ship home onto shore for inspection and repair. But when calculating the damage the cost of this operation is not taking into account nor do they account for the idle time of the ship while waiting for dry dock.

Training captains work unsupervised in many enterprises. The recurrence of emergency situations and the areas of work assigned to them does not elicit the proper reaction from the administration, analysis of the activity of these people is conducted rarely and even then it is unsatisfactory, and reports are not heard at the councils of the steamship line. Work for raising the professional level of the navigators and rendering them practical assistance is organized poorly, and advanced practice is disclosed and disseminated poorly.

A considerable proportion of the accidents taking place in the river fleet are related to violations of official duties by navigators and ignoring the safety requirements. The steamship "G. V. Plekhanov" was sailing along the Volga in an express trip from Vostov to Moscow with 339 passengers on board. On 4 July 1986 at 6 a.m. in the region of the mouth of the Dubna under conditions of "zero" visibility it ran into the steamship "Podolsk" which had been anchored. Fortunately nobody was hurt. As the investigations showed, the watch--Second Navigator Gorshenenko--in violation of the requirements of the rules of navigation in internal shipping routes of the RSFSR, did not give the necessary sound signals, which led to the collision. On 27 June of last year the steamship "Voskhod-37" with 60 passengers on board was traveling on the route from Abakan to Shumikha. The watch, Ryabtsev, was distracted from steering and the ship went out of the shipping lane and ran aground.

In many cases such violations are the result of a lack of discipline, poor professional knowledge and a lack of practical skills on the part of the navigators. As a result of the unintelligent actions of dispatcher Tyurin 17

placing ships in the sluice of the Volga-Don Canal and the understudy captain Stuchilin, who did not provide for safe mooring of the ship, the RBT-9 steamship was sunk. Similar factors caused emergencies with ships of the Volga combined river shipping line, the "Dunayskiy-15," "Sadko," "OT-2406" and others.

In September 1986 the steamship "Sergey Kuchkin" with 357 passengers on board collided with a barge that was pushing the steamship "OPA-819." The investigation established that the watch chief--Second Navigator Karpov--being drunk while on watch, fell asleep in his chair. The steamship was being steered by the helmsman Bekmukhambetov who did not have sufficient knowledge or experience in navigation. He arbitrarily moved over to the left shipping lane, in violation of the rules he passed two oncoming ships on the right-hand side, and when approaching the "OTA-891" at a distance of about 400 meters he unexpectedly changed course and intercepted the course of the oncoming ship. The captain of the latter, Alekseyev, could not avoid the collision. In addition to the inexperience of the helmsman Bekmukhambetov, this was also evidence of the lack of discipline of the captain of the steamship who, when he saw the incorrect and incomprehensible maneuvers of the oncoming ship, should have halted movement until they finally passed, but he did not do this.

A successful fight against accidents in the river fleet is impeded to no small degree by the liberal attitude of local managers to violations of safety rules and their actual indulgence. Thus the captain of the steam ship "Sormovskiy-5" of the Belomorsk-o-Onega shipping line, Sikke, when mooring in the Leningrad port had a collision with the steamship "Irtyskles." This was the third accident he had had in recent years; the damage he caused amounted to almost 10,000 rubles. But again this time the administration limited itself to a discussion in the operational conference and a strict warning to the captain; there was no question of his making reimbursement for damage to the state. Thus the irresponsibility of navigators gives rise to new violations of the established order and discipline.

Everyone can understand the direct link between safety of shipping in the fleet and the condition of labor discipline of the personnel. According to reports of enterprises, steamship lines and the RSFSR Ministry of the River Fleet, everything looks fairly good: the number of violations is gradually decreasing and the administration is reacting in a practical way to a majority of them. But there are still mass violations, the reduction of their numbers is extremely insignificant, and there is a great deal of repetition among violators of discipline. A natural question arises: why is the work being done in the fleet not producing appreciable results?

It is not difficult to find an answer if one attentively analyzes the daily practice of the administration of enterprises and organizations and figures out the essence of this work. And it turns out that the measures that are taken frequently remain on paper, many of them are formulaic, and they do not produce the desired result. In the majority of places a battle is being waged against drunkenness and allowing drunks to work. To a significant degree the plans that have been earmarked in keeping with the party and government decisions adopted in 1985 are not being fulfilled precisely in the area having to do with social and cultural measures; as before, the people have nowhere to

spend their leisure; clubs and houses of culture are frequently closed. Up to this point they have not yet eliminated all trade points for the sale of alcohol near transportation enterprises and facilities. By decision of the Ulyanov Gorispolkom of 9 September 1986, for example, it was permitted to trade in wine and liquor items and beer in two stores of the workers' supply department located next to the river port.

As concerns measures taken against violators of labor discipline, they basically amount to clarifying the violations and disciplining the guilty parties. The comrades' courts and the commissions for fighting against drunkenness that were created again in 1985 have not restructured their work and have limited themselves to discussing the materials that come in and imposing fines on the violators or adopting social punitive measures. They do not engage either in an analysis of the work, or a generalization of the state of affairs at the enterprise, or reporting from managers of structural subdivisions that are not providing for the proper order. Trade union committees do not devote attention to these problems either.

Moreover, there are frequent cases in which punitive measures determined in the orders also remain on paper. The captain-mechanic Zakharov, according to the order, was demoted to a helmsman-engineer as punishment for organizing a drunken party on the steamship "Tura" of the Krasnoyarsk Repair and Operations Base of the fleet. Actually he remained in his former position, continued to drink, and violated labor discipline until he was fired for absenteeism. This is clear evidence of the level and content of educational work being conducted in the collective of the base.

The Kazan transportation procurator during the course of an inspection in the river port discovered a number of people who were drunk in the work places. It turned out that the leadership of the port had not been actively fighting against drunkenness among its subordinates, the commission for fighting against drunkenness was inactive, and at its meetings it had not considered a single statement from the line internal affairs division of the port of Kazan. They did not react keenly to statements from the labor collective either. At the same time in just 8 months of 1986 150 port workers spent time in drunk tanks.

In the fleet, as a result of this kind of "principled" attitude on the part of managers to maintaining a high level of labor discipline, as before, accidents linked to navigators who are working while drunk have been widespread as before. The steamship "Vanavary," steered by the drunk understudy captain Bordasov, when approaching a bridge in Krasnoyarsk hit an above-water object in the span, the ship sunk and was put out of operation for 10 days.

The helmsman-engineer of the steamship "Zarya-285," Kamov, and the sailor Sapakhutdinov were drinking alcoholic beverages on watch. Then they decided they wanted to "go for a ride." While trying to put the steamship into motion they grossly violated the rules for operating the engine. The Bel'skoye steamship line sustained damage amounting to 2,640 rubles.

The transportation police in conjunction with workers of the Canal imeni Moscow, in order to prevent an accident, detained the steamship "Spassk" from

registering in the port of Kasimov; the crew, headed by Captain Siluyanov, was drunk. What kind of safety of ship traffic can there be under such conditions?

Each year many shortcomings are revealed in the maintenance of domestic shipping lines, which also has a negative effect on the condition of the safety of shipping. There are widespread cases of removal of equipment, damage to various signal devices on water and on shore, but for some reason the internal affairs agencies do not report these and therefore no battle is being waged against them.

To no small degree the accident rate of ships of the RSFSR Ministry of the River Fleet is related to the poor quality of their repair. The administration of the ship repair enterprises is not waging a fight against defective work done in the repair of ships and is not applying the full force of the law against defects. Moreover, the reimbursement for the damage is unsatisfactory. Frequently bonuses are awarded for this kind of "repair."

Numerous violations of the law are widespread in the system of the RSFSR Ministry of the River Fleet because the ministry does not perform its organizational, coordinational and control functions for observance of the requirements of legislation concerning safe navigation in the steamship lines and enterprises under its jurisdiction. The decisions of the board of the ministry are frequently not implemented and supervision of this is formulaic to a significant degree and therefore ineffective. Many of the earmarked measures are not specific and it is sometimes impossible to check on their fulfillment. When evaluating the activity of individual managers an uncritical approach is frequently taken and there is no severity or adherence to principles.

There are cases of permissiveness in dealing with violators of the law. A paradoxical situation has arisen in the Lena Combined River Steamship Line: the deputy chief of the steamship line, Arbatskiy, who is responsible for the safety of navigation, is indulgent toward violators of safety rules. As it was explained, it was precisely these violations that were the cause of many accidents during the navigation period of 1985, although a sharp increase in the accident rate in the steamship line was explained by the difficulties of navigation under conditions of the large amount of smoke over the river caused by forest fires.

The Ministry has long been well aware of Arbatskiy's failure to perform his duties for following safety rules, particularly from the determination of the supreme court of the Yakut ASSR of 10 January 1986 and the report of the deputy chief of the main inspection for safety of shipping, A. Ozol, who in December 1985 conducted an inspection of the steamship line. But for a long time no effective measures were taken either against Arbatskiy or the chief of the steamship line, V. Mineyev.

In the subdivisions of the ministry they have not yet eradicated the style of work based on paperwork and office work, and there are frequent violations of executive discipline. Thus last year they did not conduct the inspections envisioned by the plan in the Northwestern Basin, the Cherpovets Rybinsk, and

Gorodets sections, in the Belomorsk-o-Onega Steamship Line concerning the implementation of orders of the ministry pertaining to safety of ship navigation. At the same time the plans contained more than enough points concerning the organization of measures that are actually the functional obligation of the subdivisions themselves or the corresponding local agencies. Thus clearly inadequate attention is being devoted to work with people in the actual places where they work.

The results of the inspection show quite clearly that there has been no restructuring in respect to questions of ensuring safety of navigation in the system of the RSFSR Ministry of the River Fleet, and we assume that it should be started with the Ministry itself--the staff of the branch, which should be the real leader and organizer.

From the Editorial Staff: the question of observance of legislation regulating safety of navigation of ships was discussed at a meeting of the board of the RSFSR Procurator's Office with the participation of managers of the RSFSR Ministry of the Maritime Fleet, the RSFSR Ministry of the River Fleet, and transportation procurators.

The causes of the violations were analyzed and shortcomings in the organization of procurator supervision of their implementation were noted.

The board developed proposals concerning elimination of causes and conditions contributing to violations of rules of traffic safety; additional measures were earmarked for strengthening procurator supervision over the fulfillment of legislation concerning safety of ship navigation and demanded that the procurators fulfill them immediately.

The editorial staff hopes to receive answers from the ministry and the steamship line telling specifically what has been done so that navigation in internal waterways of the republic will be safe and no more irreparable harm and material damage will be caused to the state because of negligence and irresponsibility of workers of the fleet. It is time to begin the restructuring not in words but in deeds, as the party is requiring of all of us today.

We are also expecting reports from transportation procurators about how they are fulfilling the decision of the board of the RSFSR Procurator's Office and about the results of repeated procurators inspections which, we are convinced, are necessary and will be conducted.

The editorial staff, in turn, plans to inform the magazine's readers of this.

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